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Heat-Treated Automobile Frame Steel

Comparisons of Alloy and Carbon Steels—Typical Analyses of the Former —Resistance to Alternating Stresses

BY D. K. BULLENS*

In order to understand fully the factors entering into e choice of materials of construction of the automobile rame, it is necessary to consider the following points: The relation of the type of frame design to the mate-al. 2. Untreated steel as against heat-treated steel. 3. he dynamic properties of the steel.

Frame Design and Shock Absorption

Automobile frame design may be broadly divided by e manner in which the shocks and strains caused by bad oads and by the vibration of the engine are to be absorbed. he material to be used will depend upon this design to very large extent. The shock and vibration may be: 1) deadened, (2) overcome by mass, (3) mitigated by springiness," or 4) absorbed by turdy construc-ion. The first lass makes use f a wooden rame, the argu-nent of the man-facturer being hat the wood ills or deadens he vibration. With the in-reased size and trength de-manded by the reater load and ower of the ew cars, this aterial has been ery nearly elim-nated from the eld, and does not pertain to this discussion.

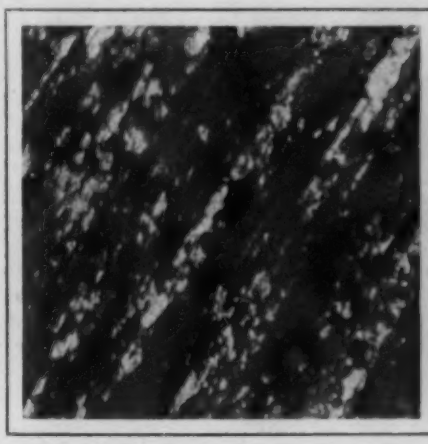

Fig. 1—Photomicrograph of Section of Channel Flange, Untreated. (60 Diameters)

Fig. 2—Photomicrograph of Section of Same Channel Flange, Treated. (60 Diameters)

The second class may be likened to the bed of a heavy laner or milling machine. The mass of the frame is so rge and heavy in comparison with the vibration, that the utomobile negatives the latter. Such is the argument of e manufacturers of this type of car. In general, we ay say that the first class is prone to weakness, while e second class is characterized by an extremely heavy r unwieldy car, necessitating additional driving force. oth of these divisions are now in the minority.

Springiness as Against Sturdy Construction

The third class may be best described by an incident. party was riding in an automobile of this class with ne of the company officials. While passing over some reet-car tracks, the front wheels caught in the track. he front part of the frame was twisted out of line for e moment, but upon the release of the wheels it sprung back into alignment. The official remarked that the incident explained the principle of the design of the frame of that particular car—that is, "springiness." This class is generally characterized by a light frame, with the side bars usually of small section. In order to make this design at all feasible under hard running conditions, the steel should be of the very best—heat-treated, alloy steel. Only too often is this requirement disregarded by the manufacturer. As the major portion of the strains to which the frame is subject enter through the hanger end of the side bars, they reach the front cross-member practically unimpeded. As the cross-member acts as a stay or brace at this point, there must necessarily be a locus of the separate forces at this section of the side bar and this results in a tremendous strain. If the section is not of sufficient size or of suitable steel a break results. This is not a rare but a common occurrence.

The fourth class is generally typical of the larger and higher power cars, which have what we may term "sturdy construction." The side bars are of suitable section, and usually of heat-treated, chrome-nickel steel. The frame is substantial, but not unwieldy, the higher physical properties of this particular steel making an extremely heavy frame unnecessary. The shocks are to be entirely absorbed by the springs and frame, so that only a very small proportion shall actually reach the body of the car. Engineers are divided as to the relative merits of these last two classes, as is shown by the numerous automobiles of each type. But whichever of the two is used, the character of the steel entering into the frame construction must be carefully considered. As will be shown later, alloy steel without heat treatment is of little value, while heat treatment applied to straight carbon or alloy steels of suitable composition greatly enhances their value.

The motor truck has now entered the market in a most aggressive manner, so that mention should also be made of it. The design of a suitable frame for a motor truck is a much simpler affair than that of the pleasure car, as the former simply requires strength and durability. Leaving aside the actual design, the two important features to

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be considered, as far as the materials of construction are concerned, are the I-beam and the heat-treated channel section. Metallurgically there should be no hesitation at all; the former cannot compare with the latter.

Changes in Steel Used for Frames

A decade ago when the automobile steel frame was in its infancy, cold-rolled, low carbon, Bessemer steel was the only metal on the market for this sort of construction. This steel generally analyzed from 0.07 to 0.10 per cent. carbon. From this statement, however, it must not be assumed that such steel was ordered to specifications. Far from it, indeed; in the eyes of the automobile manufacturer at that time, steel was simply steel! Then, with the ever-increasing ascendancy of the open-hearth process, and the decline of the Bessemer process, open-hearth, cold-rolled steel was specified. The steel mills, using the argument of the better quality of the open-hearth steel, increased their profits by charging two or three dollars more a ton for their steel if open-hearth was specified. Prices were soon equalized, however, and at the present time all sheet steel used in automobile frames is open-hearth.

Cold-rolled steel was specified at first simply for the bright finish obtainable. Having obtained this foothold, for many years it was practically the only steel in use for automobile frames. With the lowering prices some few years ago, hot-rolled steel came into use, and will probably supplant the cold-rolled material within a short time.

The growth of the steel frame business was somewhat hampered in the beginning by the difficulty experienced in obtaining sheets of sufficient length and width. Formerly a frame of 100 in. in length was considered large. Educational methods have now resulted in sheets double the original widths, while a side bar requiring a sheet of 250 in. in length is not at all unusual.

Alloy Steel with Heat Treatment

With the increasing weight and size of the car came the demand for a better and stronger steel. This requirement was filled for the time by the use of a higher carbon steel, giving an elastic limit of some 30,000 lb. per sq. in. Then in 1905 came the important departure of using alloy steel, together with a suitable heat treatment, with the formation of a company by Eastern steel men to enter the automobile frame business. This company experimented with various types of nickel, chrome-nickel and manganese steels, heat treated, which resulted in the present general types of chrome-nickel steel and special carbon steel used by them and by companies which have lately entered the alloy frame business. The true worth of chrome-nickel steel as against carbon steels may be appreciated by noting the dynamic strength and quality figure given in the last part of this article.

The problem of selecting the proper steel for an automobile frame is an all-important one, for upon the strength and proper construction of this frame will depend the safety and lives of the automobilists. A large part of the frame troubles probably never reach the ears of the manufacturer. The owner, having a car with a broken frame, will often have it repaired in some crude way by a blacksmith rather than forego the use of his car for some weeks. If the automobile manufacturers in general were aware of the number of frame failures, they would undoubtedly pay more attention to their frame specifications.

The steel must be chosen with a view to the metallurgical and mechanical treatments in mind, and with due regard to the conditions to be met with in finished car or truck. As is well known, carbon, manganese, phosphorus, sulphur, etc., affect steel in diverse ways. Some are injurious; others confer added elasticity, hardness or toughness, and increase the efficiency of the steel for certain usage peculiar to automobile frames. In short, this means a special steel, which, upon further treatment, will be the best for the existing conditions.

Carbon Steels

The straight carbon steels, without such alloying elements as nickel, chrome, vanadium, etc., may be roughly divided into three classes according to their carbon contents, as follows:

	A	B	C
	Per cent.	Per cent.	Per cent.
Carbon	0.10 to 0.18	0.19 to 0.26	0.27 to 0.35
Manganese	0.30 to 0.50	0.40 to 0.60	0.40 to 0.60
Phosphorus	Under 0.05	Under 0.04	Under 0.04
Sulphur	Under 0.045	Under 0.04	Under 0.04

The use to which each type of steel is put is dependent upon the physical properties desired, and upon the nature of the steel in relation to such mechanical operations as forming and bending. The steel of Class A is generally used where the selling price of the frame, and therefore the cost of manufacture, must be kept low. The very soft steel has relatively small strength, responds but poorly to heat treatment, but is the more easily pressed into shape on account of its greater ductility. Annealing before the forming operations may or may not be necessary, depending upon the care and amount of work put upon the steel during rolling and upon the design of the side-bar.

The steel of Class B is the most suitable for frame purposes where alloy steel is not desired. As a general proposition, steel with a carbon content of 0.23 or 0.24 per cent. may be said to have the greatest resistance to the dynamic stresses common in automobile frames. Under suitable heat treatment this particular grade of steel responds excellently, giving much higher physical results and a better all-around frame. The physical properties thus obtained, in combination with suitable characteristics for easy forming or bending to shape, make this analysis a favorite with manufacturers of higher-priced frames.

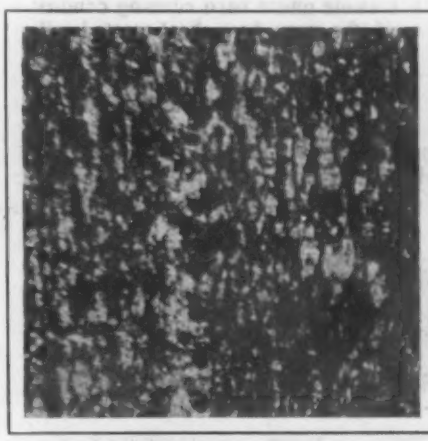


Fig. 3—Photomicrograph of Section of Channel Web, Untreated. (60 Diameters)

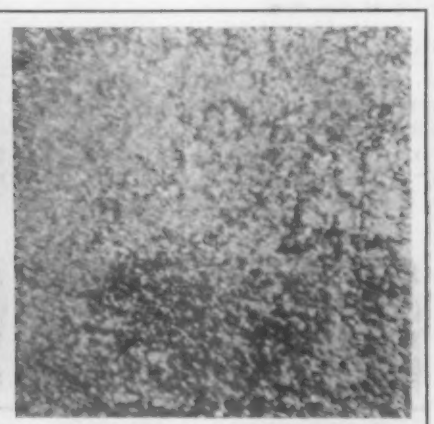


Fig. 4—Photomicrograph of Section of Same Channel Web, Treated. (60 Diameters)

Steel of analysis corresponding to Class C is but little used at the present time. Although it possesses greater strength on account of the higher carbon content, difficulties and losses occasioned in forming, as well as the higher price of material, have practically eliminated steel of over 0.30 per cent. carbon.

Alloy Steels

Practically all automobile manufacturers producing a superior and lasting car are now using alloy steel frames. Many analyses have been experimented with at one time or another, but chrome-nickel steel maintains its pre-eminent position in the frame of quality. To show the diversity of analyses, and yet at the same time to illustrate the general limits which have proved acceptable, the following specifications are given. It might be added that these, comprising chrome-nickel, chrome and nickel, chrome-vanadium and titanium, represent the composition of practically all alloy steel frames now on the market.

ALLOY STEELS FOR AUTOMOBILE FRAMES

Chrome-Nickel Steels

	Per cent.	Per cent.	Per cent.
Carbon	0.10-0.20	0.20-0.26	0.22-0.28
Manganese	0.40-0.60	0.50-0.70	0.40-0.50
Phosphorus	Low	Under 0.02	Under 0.03
Sulphur	Low	Under 0.03	Under 0.03
Chrome	0.40-0.60	0.70 or over	0.40-0.55
Nickel	1.75-2.00	1.75-2.00	1.40-1.60

Chrome and Nickel Steels

	Per cent.	Per cent.
Carbon	0.20-0.25	0.15-0.25
Manganese	0.40-0.60	0.40-0.60
Phosphorus	Low	Low
Sulphur	Low	Low
Chrome	0.75-1.25	.....
Nickel	.....	3.25-3.75

Chrome-Vanadium Steels

	Per cent.	Per cent.
Carbon	0.18-0.25	0.25-0.32
Manganese	0.35-0.50	0.40-0.60
Chrome	0.60-0.80	0.80-1.00
Vanadium	Over 0.16	Over 0.16
Silicon	Under 0.20	Under 0.20

Titanium Steel

	Per cent.
Carbon	0.10-0.20
Manganese	0.40-0.60
Phosphorus	Low
Sulphur	Low
Titanium	0.05-0.15

With the exception of the extremely low carbons, the three classes of chrome-nickel steel previously given may be heat-treated in such a manner as to give approximately the same physical characteristics. These may be roughly given as follows:

Annealed

Tensile strength, lb. per sq. in.	60,000 to 70,000
Elastic limit, lb. per sq. in.	25,000 to 35,000
Elongation, per cent. in 2 in.	35 to 25
Reduction of area, per cent.	55 to 45

Heat Treated

Tensile strength, lb. per sq. in.	95,000 to 115,000
Elastic limit, lb. per sq. in.	80,000 to 100,000
Elongation, per cent.	20 to 15
Reduction of area, per cent.	55 to 45

There is little call for straight 3½ per cent. nickel steel at the present time, not only on account of the higher cost, but also on account of the slightly weaker static and dynamic properties as compared with the chrome-nickel steel. Chrome steel has been used with but indifferent success, and does not possess the high dynamic resistance of the chrome-nickel and chrome-vanadium steels. One steel mill supplying a chrome-vanadium steel for frames has put a steel on the market for this purpose which gives the same approximate static properties as those previously given for chrome-nickel steel. Tests made upon this steel by the author did not, however, show as good results dynamically as did the chrome-nickel steel.

One large manufacturer of automobiles some time ago sent out an inquiry for carbon steel with a small amount of contained titanium. From results obtained by heat treatment on similar steels for other purposes it is doubtful whether such a steel will give much higher results physically than obtained in straight carbon steels. Further experimentation will probably have to be done before the exact helpfulness of titanium when added to steel of high quality can be determined.

Effect of Heat Treatment on Structure

Metallurgists will tell the uninitiated how steel resembles granite, in that it is made up of innumerable crystals, often too small to be seen with the unaided eye. A little thought will convince one that the qualities and properties of the steel will be directly dependent upon the size and arrangement of these crystals. The closer the crystals interlock with each other, the stronger the steel. Also, the smaller the size of the crystals, the greater the number of crystal faces which will fit into each other. Upon this internal structure will depend in a large measure the physical properties of the steel. The control of the structure, assuming a proper chemical composition, is vested in the metallurgical treatment which is given the steel. Chemical composition (special steel) and internal structure (special heat treatment) must go hand in hand.

This heat treatment is not to be a hit-or-miss affair, but must be conducted rationally and in an approved manner under the direction of a competent metallurgical engineer. For each heat of steel a separate treatment must be worked out. Steel of high quality—and such only should be used in frame construction—is very susceptible to change by a few degrees of heat at high temperatures. This is easily demonstrated by the use of a testing machine in conjunction with accurate pyrometers. The results from heat treatment will amply justify the efforts expended. In general it is as yet in its infancy, but specialization in this branch of metallurgy will have a rapid growth. Educational methods are being used by many companies to urge this fact upon the consumer.

Let us consider the effect of proper heat treatment upon frame steel. A strip of straight carbon open-hearth steel was pressed into a channel. Photomicrographs were then taken of a section of this channel, as shown in Figs. 1 and 3, the former from the flange and the latter from the web. This steel is characterized by the laminations given it by the rolling operation, by very coarse crystallization, and by lines of weakness due to the crushing of the crystals in the forming operation. That is, the steel is so stressed that it is unsuited in its present condition to frame conditions. And yet some manufacturers persist in using such steel, and wonder why their customers complain that the frame is unsatisfactory.

The channel was heat-treated by a special process, and photomicrographs taken of the same section, as shown in Figs. 2 and 4. Note the great contrast between the untreated and the treated steel. A fine, even grain has replaced the coarse crystallization, and all signs of weakness have been obliterated. The elastic limit of the steel has been nearly doubled, as is shown by the following results:

	Untreated	Treated
Elastic limit, lb. per sq. in.	28,950	57,300
Tensile strength, lb. per sq. in.	50,600	85,000
Elongation per cent. in 2 in.	37	28.25

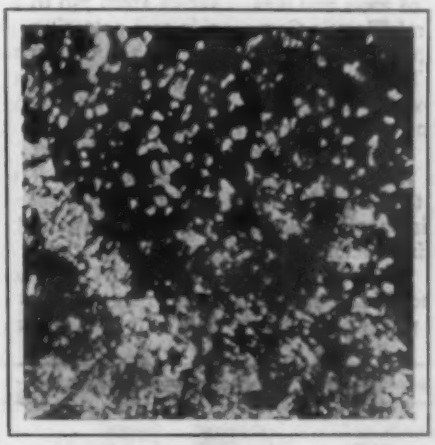


Fig. 5—Photomicrograph of Section of Broken Side-bar, Untreated. (60 Diameters)

The effect of using untreated stock for frames is also shown in Fig. 5. This photomicrograph was taken from a frame broken or cracked in six places. The structure of the steel is very uneven and shows much weakness.

An automobile frame is subject to two general classes of stresses: static and dynamic. By "static" stresses are meant the weight of the dead load, such as machinery, body, passengers, etc. It is upon this total load and its distribution that the design of the frame with its component members is usually arrived at, allowing for a certain factor of safety. But there are also other extremely important stresses to which the frame is subject on account of its make-up, and which are too often neglected in selecting material for the frame. These are set up by the vibration of the engine, and by the constant bumping on uneven ground. The latter may be partly or wholly taken up by the springs, but the former can but pass into the frame itself. These continual shocks and alternating stresses, though primarily small in amount, soon play a very important part in the "life" of the car. To these complicated kinematic forces and fatigue resisting power are given the name of "dynamic" stresses. That these are not a direct function of the static strength is shown by numerous every-day failures in all lines of steel construction, and which can be attributed to no other cause but dynamic weakness.

In order to gain some idea of the relative merits, dynamically, of automobile frame steel, a series of tests was made with a machine designed by the author. A test-piece, approximately 0.174 in. x 0.500 in. x 6 in., carefully finished, was clamped at one end in a vise. A tool-steel head, with a 0.5-in. slot, was placed over the other end, the distance from the striking center of this head to the vise-line being 4 in. A crank and connecting rod, operated by a 0.5-in. eccentric, furnished the reciprocating motion for the head, causing a rapid vibration of the test-piece. In addition to this alternating flexure, the test piece was also subjected, at each reversal, to an impact, due to the slot in the reciprocating head. The combination of alternating flexure and impact, at 1200 complete alternations per minute, subject the steel to forces very closely

approximating those operating on an automobile frame.

The results given in the accompanying table show very clearly the advantages of heat treatment, as also of the use of special chrome-nickel steel. The latter point is strongly brought out by a comparison of steels 1 and 2, both having the same elastic limit. It will be noted that the annealed chrome-nickel steel is nearly 2.5 times

Resistance of Treated and Untreated Steels to Fatigue

	Alternations	Quality figure
1. Carbon steel, cold-rolled, not treated.....	129,600	225
2. Chrome-nickel steel, annealed.....	319,200	375
3. Carbon steel, hot-rolled, heat-treated.....	421,200	896
4. Chrome-nickel steel, heat-treated.....	670,800	2400

$$\text{Qual. Fig.} = \frac{\text{Elast. lim.} \times \text{Reduc. Area} \times \text{Dynamic Fig}}{10^9}$$

stronger dynamically than the carbon steel. The great advantages of heat-treated chrome-nickel steel over the others is clearly illustrated by the quality figures. These have been arbitrarily taken as consisting of the following components: 1. Elastic limit, showing the range of load commercially available. 2. Reduction of area, as the measure of the static ductility of the steel. 3. Alternations (dynamic figure), being a measure of the fatigue-resisting power. The product of these components should give a measure of both the static and dynamic strength of the steel.

Electric Hardening Furnace

A Preheater Used for Large Tools—Equipment of a Plant Handling 65,000 Pieces a Year

The electric furnace for the hardening of tools and dies, shown in Fig. 1, is a product of the General Electric Company, Schenectady, N. Y. An earlier type was described in *The Iron Age* of December 3, 1908. The present furnace is larger and embodies some improvements in practice, including the use of a preheater. The crucible or container for the bath is lined with large special firebrick slabs, fitted and cemented together so as to prevent leakage of the bath. The dimensions of the crucible are 8 x 8 in. by 12 in. deep, although the bath is only 8 in. deep. The lining is surrounded by heat-insulating material and the whole contained in a sheet iron case. Two iron electrodes, located on opposite sides of the crucible, are of such area as to cause the current to flow through practically every

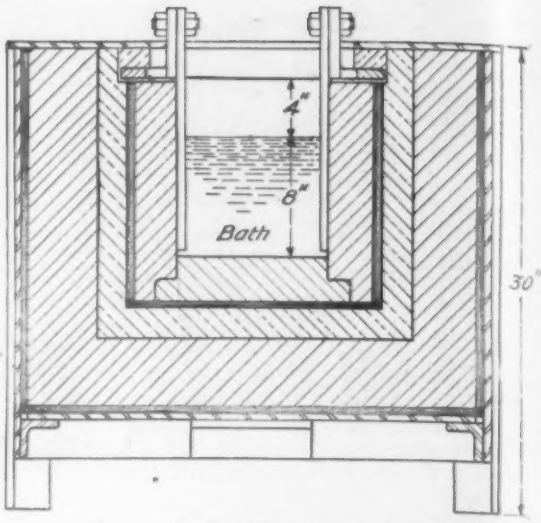


Fig. 2—Sectional Elevation of Furnace

part of the bath, giving uniformity of temperature. The hood for the furnace contains a warming oven. Some gas is given off in starting the furnace, yet the amount given off during normal operation is inappreciable.

The kind of bath used in this type of furnace depends upon the temperature at which it is to be operated. For hardening carbon steel, where the temperature required varies from 750 to 1000 deg. C, a mixture of barium chloride and potassium chloride is used, the proportions varying with the temperature. The higher the temperature, the greater is the proportions of barium chloride. For ordinary tool steel equal parts by weight of the salts are recommended. Yet it is advisable to vary the proportions so that a minimum amount of vapor will be given off at the temperature at which the bath is to be operated. For hardening high speed steel, where temperatures up to 1300 deg. C. are required, barium chloride only is used.

The temperature of the bath is determined by a pyrometer. The thermo couple is generally inclosed in a steel tube so as to give it maximum life. With the scale of the millivoltmeter calibrated in degrees the exact temperature

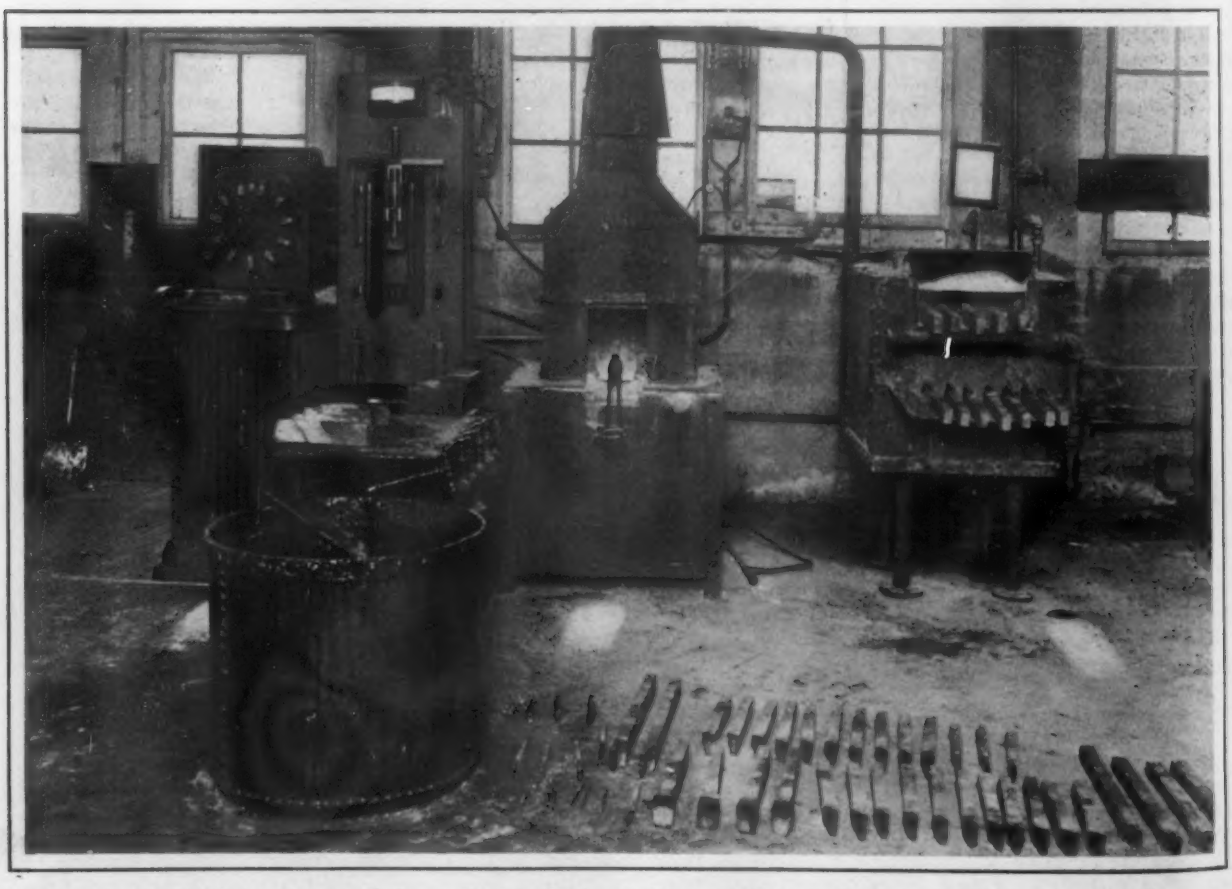


Fig. 1—Electric Hardening Furnace Equipment Used in Blacksmith Shop at the Schenectady Works of the General Electric Company

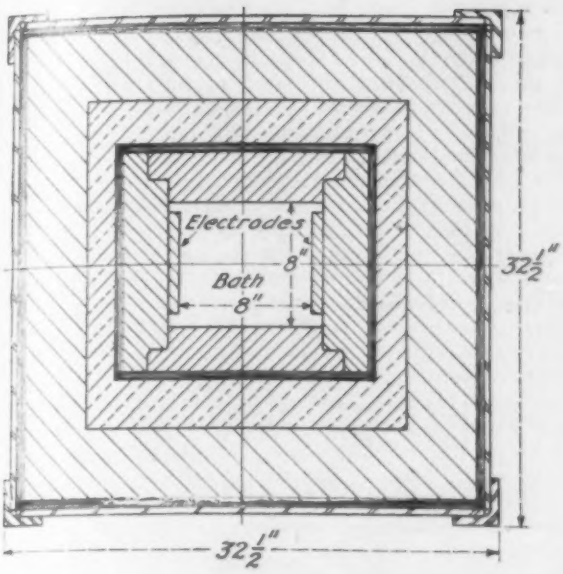


Fig. 3—Plan of Furnace

is readily obtained. When a tool is placed in the bath, a crust of solidified salt forms on it, which, being a poor conductor of heat and melting slowly, prevents too sudden heating.

Preheating is advantageous, especially in the case of large tools, as it in a measure prevents distortion. When the tool has attained the temperature of the bath, it is removed, a thin film of the salt adhering to it and preventing oxidation. This salt chips off when the tool strikes the cooling medium, leaving a clean surface.

The equipment shown in Fig. 1, is installed in a blacksmith shop for hardening high speed steel, where about 65,000 tools are handled per year. The tools are first placed in the preheater, shown at the right of the illustration. This is oil fired, the air blast having a pressure of 8 oz. The tools are placed so that their cutting ends project over the burners. When heated red hot, the attendant removes them and places them in the furnace, at the same time pressing the button of the clock device, shown to the right of the furnace, turning on the lamp. At the end of the period for which the timing device is set, the lamp goes out, notifying the attendant to remove the tools. The proper period is determined by testing to determine when the tool has reached the temperature of the bath. The tools are quenched in the oil bath shown to the left, which is agitated by air to keep it cool. An air blast is also provided for cooling and is shown just in front of the pyrometer. Some of the tools hardened in this furnace are shown on the floor in the foreground of the illustration.

Fig. 2 is a sectional elevation of the furnace and Fig. 3, a plan.

A Double-Crank Toggle Drawing Press

Recently, the E. W. Bliss Company, 11 Adams street, Brooklyn, N. Y., has designed and built a new type of press which it designates as a double-crank toggle drawing press. This new press, the principal features of which are covered by patents, is adapted for the drawing and forming of articles of large area and considerable depth such as automobile radiators, fenders, stove tops and a similar class of work from heavy gauge sheet metal. As compared with the standard double crank presses, which were formerly used for this work in connection with a spring pressure attachment, it is pointed out that the new type possesses many advantages, especially if the article to be produced has a considerable depth. As will be noticed from the accompanying engraving, the press is of large proportions, the over-all hight being 19 ft., while the floor space occupied measures 235 in. in width and 104 in. in depth.

The construction, which is rigid, is of the builders' standard tie rod type, in which the bed, uprights and the crown piece are tied together by four vertical steel tie rods which are shrunk in place and take the entire working strain, thus, it is emphasized, relieving all cast-iron parts from any tension. The power is transferred from the main driving gears to the outside slide or blankholder to a series of toggles and a dwell of 110 deg. obtained, the power being transferred at both ends of the press. In connection with this construction, which, it is emphasized, avoids any torsional strain and is both simple and efficient, the number of toggles and connections used is kept at a minimum. The principle of twin driving is also applied in connection with the crankshaft which operates the inner slide, this shaft being driven through gears at each end. In addition to using a small number of connections or links in transmitting power to the outside slide or blankholder, the connection pins are hardened and ground to approach the point of minimum wear.

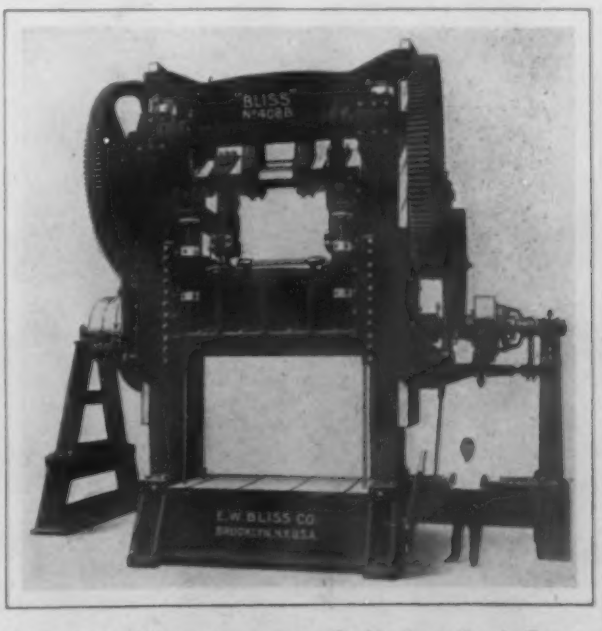
A powerful hand-actuated friction clutch of the double grip type regulates the machine and gives the operator control of the moving parts at all times. As a precaution against possible accident or damage to the machine through the dies being incorrectly set or any article placed where it would interfere with the proper operation of the machine, safety couplings are provided for both the flywheel and the tight pulley. The machine is doublegeared, the ratio of the gearing being 42 to 1 and the entire train of gears are of steel castings with machine cut teeth. The loose pulley and all the backshaft bearings have bronze bushings which have babbitt with graphite cast in them to assist in lubrication.

A counterweight placed in the driving gears counterbalances the inner slide, while the outside slide or blankholder is counterweighted by the outside cross-heads which also are the direct links between the rock shafts and the driving gears. This slide is adjusted by four screws, as is clearly brought out in the accompanying engraving, and the adjustment of the inner slide is regulated by adjusting screws which operate in unison and serve to keep the faces of the slide and bed in correct alignment.

The following table gives the principal dimensions and specifications of the press:

Distance between bed and inner slide, stroke and adjustment up, in.	68
Distance between bed and outer slide, stroke and adjustment up, in.	60
Stroke of inner slide, in.	18
Stroke of outer slide, in.	12¼
Depth of bed, in.	44
Width of bed, in.	84
Width of blankholder face, in.	76
Depth of blankholder face, in.	42
Depth of plunger face, in.	30
Width of plunger face, in.	68

This press is one of a series, the general construction and operation being practically the same in all. In the larger sizes an independent motor mounted on the slide operates the adjustment.



A New Style of Press Known as the Double Crank Toggle Drawing Type for the Drawing and Forming of Articles of Large Area and Considerable Depth from Heavy Gauges of Sheet Metal

New Ball Bearing Grinding Machine

Handwheel, Not Pump, Regulation of Water Supply a Feature of the Wet Type

The Springfield Mfg. Company, Bridgeport, Conn., has brought out a new line of wet and dry ball bearing grinding machines. The Brandes open side 20-in. wet tool grinding machine, shown in Fig. 1, which is named for Hermann F. Brandes, the head of the business, is so constructed that a worn or damaged wheel can be removed readily and another substituted. The operation is to take off the hood and unloosen the nut on the end of the spindle.

Fig. 1—Front View of a New Ball Bearing Wet Grinding Machine

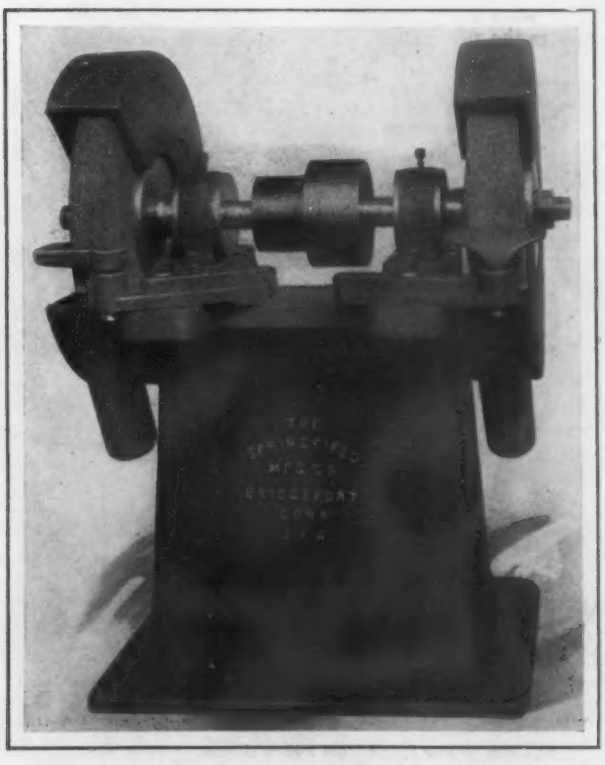


Fig. 3—The New Ball Bearing Dry Grinding Machine

Pumps have been eliminated, together with pipes and water connections, levers and ratchets. The water supply is regulated by a rising and lowering reservoir, operated by the large handwheel on the side of the table, a slight movement of which determines the amount of change. The reservoir, which can be seen in the rear view of the machine, Fig. 2, extends beyond the base, to permit of filling. The water level is visible, thus avoiding the chance of an overflow. The door at the front of the base provides an opening large enough for the withdrawal of the reservoir. The water apron is large for a machine of this size, and in conjunction with the convex surface of the tool rest, reduces to a minimum the escaping spray.

The ball bearings are of the annular type, and are amply large for the load imposed upon them. Fig. 2 also shows the motor application, a construction which permits of the use of either direct or alternating current.

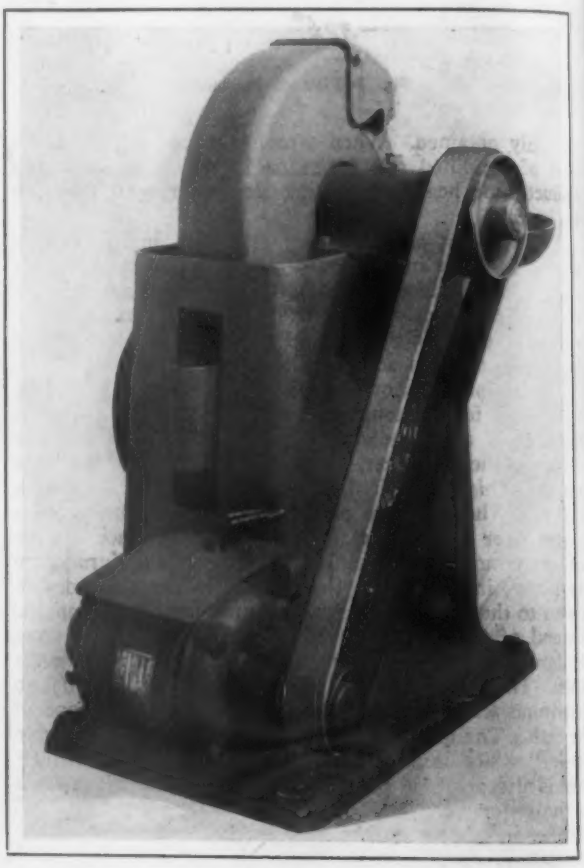


Fig. 2—Rear View of a New Ball Bearing Wet Grinding Machine

The specifications of the machine are as follows:

Diameter of wheel, in.	20
Face width of wheel, in.	2½
Speed of wheel, r.p.m.	900
Diameter of spindle between wheel collars, in.	2
Length of bearing, in.	11
Face width of spindle pulley, in.	3½
Diameter of spindle pulley, in.	8
Face width of countershaft pulleys, in.	3¼
Diameter of countershaft pulleys, in.	8
Face width of countershaft driving pulley	3½
Diameter of countershaft driving pulley, in.	12
Speed of countershaft, r.p.m.	600
Net weight of machine, lb.	700
Skidded weight of complete machine, lb.	750
Weight of countershaft, skidded, lb.	130
Weight of wheel dresser, lb.	20

The dry grinding machines, one of which is shown in Fig. 3, are built in two sizes, for 24 and 16 in. wheels. They are designed to meet the severe conditions imposed by modern practice, under continuous service, with a low power consumption. The outer ball bearing is especially designed for grinding machine usage, with two packing rings on each side, and in addition the end shell fits closely to the shaft, thus rendering the entrance of dirt or dust to the ball bearings practically impossible. The bearings are filled with lubricant, sufficient in amount to provide for a considerable period of operation.

The following table gives the principal dimensions and specifications of the two sizes:

Maximum diameter of wheel, in.	24	16
Maximum face width of wheel, in.	4	2
Hight of spindle center, in.	34	37½
Length of spindle, in.	44½	27
Distance between wheels, in.	30	18
Diameter of spindle between collars, in.	2	1¼
Diameter of wheel collars, in.	10	5
Diameter of largest step of spindle cone pulley, in.	8½	5
Diameter of smallest step of spindle cone pulley, in.	6	3½
Width of steps of spindle cone pulley, in.	4⅜	2½
Diameter of largest step of countershaft cone pulley, in.	17	8
Diameter of smallest step of countershaft cone pulley, in.	14½	16½
Width of steps of countershaft cone pulley, in.	4⅜	2¾
Diameter of tight and loose countershaft pulley, in.	12	9
Face width of tight and loose countershaft pulley, in.	5⅛	3¼
Speed of countershaft, r.p.m.	350	400
Weight of countershaft, lb.	175	140
Weight of machine, without wheels, hoods or countershaft, lb.	850	400
Weight of machine, with wheels and hoods, lb.	1,400	625
Floor space required, in.	28 x 44½	20 x 27

The machine is furnished with hoods, as shown, or without. The hoods inclose the wheels with the exception of the space required for grinding. The end cover may be removed conveniently to facilitate the changing of wheels. The hoods are furnished with or without exhaust connections.

The McDonald Charcoal Blast Furnace

Further details regarding the 100-ton charcoal iron furnace to be built at Ellsinore, Mo., by the McDonald Charcoal Iron Company, show that the plant and equipment will cost about $400,000. L. W. Searles, Birmingham, Ala., is the engineer. The operations will include chemical, mining and ore concentrating plants. Brown ore will be used, which is low in phosphorus and carries above 50 per cent. metallic iron with 1 to 2.50 per cent. of manganese. The company has between 8000 and 9000 acres of ore land, with most of the mining locations in close proximity to the furnace site. Construction work will begin in August, it is stated, and in addition to the furnace and allied equipment a water works and electric light plant will be built. The concentrating plant will be of 400 tons daily capacity. The hardwood timber available is mostly of oak and similar varieties, making excellent charcoal.

A Booklet on Boilers.—The E. Keeler Company, Williamsport, Pa., has issued an elaborate booklet descriptive of the water-tube boilers which it manufactures. The company was established in 1864 and its boilers have become constantly wider known and are now quite extensively used. The booklet is very complete and gives an account of all parts used in the construction and equipment, some of them illustrated. There are also fine photographs of various installations of the two types of boiler, the horizontal and cross drum, using oil equipment, chain grate stokers, underfed stokers, etc. Considerable space is devoted to tables of complete tests made on boilers already in use. Conspicuous among these are those made by the Government at the Gatun and Miraflores locks, Panama Canal. The company has engaged in the manufacture of boilers now for 50 years and the location of the plant has never been changed.

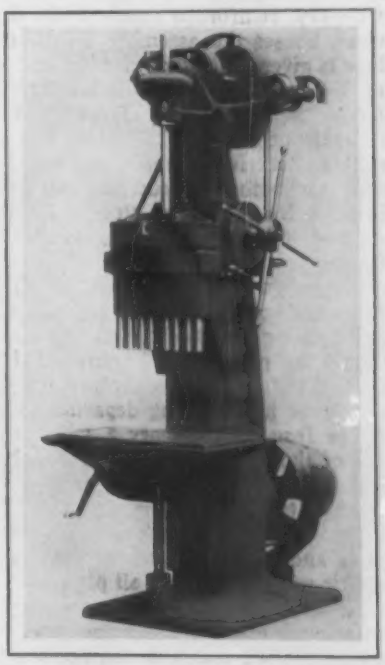
The Catskill Foundry & Machine Works, Catskill, N. Y., recently purchased from the owner the patterns, blueprints, drawings and the stock of manufactured parts for the Corliss engines put out by the Fishkill Landing Machine Company, Fishkill-on-Hudson, N. Y., and succeeds to the business of making and furnishing repairs for this well-known line of engines. George B. VanTine, former superintendent for the Fishkill concern, goes with the Catskill Foundry & Machine Works and will have charge of this branch of its activities.

Total liabilities of $340,459 and visible assets of $325,541 are listed in the bankruptcy schedules filed in behalf of the Milwaukee Motor Company, Milwaukee, Wis., by Harry E. John, secretary-treasurer and general manager. An involuntary petition in bankruptcy was filed in June by three creditors.

Eight-Spindle Vertical Drilling Machine

The growth of the automobile industry has resulted in the development of various machine tools of a special type designed for some particular class of automobile work. One of these lines is the No. 15½ multiple-spindle drilling machines of the Foote-Burt Company, Cleveland, Ohio, which are used in many of the automobile plants for doing miscellaneous drilling. This machine is built with any number of spindles, which can be arranged so as to be adjustable either universally or only in a straight line, or with fixed centers. One of this line of machines that has some novel features is an eight-spindle fixed center type. The arrangement of the different types of heads permits the use of the machine for many different classes of work.

This machine is being used extensively on valve hole work on automobile cylinder castings for boring the large valve porthole, for machining the valve seat and for drilling and reaming the valve stem guide hole. It is also used for drilling the sides of a crankcase and for drilling some of the sides of the cylinders, or for any other multiple work that is required.



A New Eight-Spindle Fixed Center Vertical Drilling Machine for Handling Miscellaneous Work in Automobile Plants

With this type of machine, having the proper number of spindles, with either fixed centers or adjustable in a straight line, it stated that it is possible to drill all the valve holes required on the cylinder as quickly as one could be done with a single-spindle machine. In some plants these machines are arranged in batteries, according to the number of operations required, and then the work is processed through the machines, each machine doing one operation. However, the smaller manufacturer can run a number of cylinders or other parts through the machine for one operation, change the tools and then run the parts through for the next operation, which, it is emphasized, enables as satisfactory manufacturing results, comparatively speaking, to be secured from the small plant as from the larger one with its specialized operation scheme.

The spindles of the machine have large bearings with bronze bushings and are arranged with a No. 4 Morse taper. The driving spindle spur gears are made of 3½ per cent. nickel steel, and the head slide on the column is extra long to insure rigidity. The driving bevel gears are made of high carbon hardened drop forgings, having planed teeth. The machine is arranged with friction throw-out back gears, a Johnson friction clutch being used. This arrangement is for taking care of the large range of sizes between the large valve hole and the valve stem guide hole on the valve hole work and also adds to the power of the machine.

The machine is driven by a three-step cone pulley, the step diameters being 15, 17 and 19 in. with a 4½-in. face. Six changes of power feed are provided by a two-step cone pulley and change feed gears. An automatic knock-off to the power feed is also arranged with a quick traverse by a large pilot spider wheel. The column of the machine is of extra heavy box section and well ribbed. The table has a large working surface with an oil groove extending entirely around it. The table is raised and lowered by a jack screw with spiral gearing.

Machining and Assembling Automobile Engines

The Routine of the Continental Motor Mfg. Company—A Plant with 240,000 Sq. Ft. of Floor Space Under One Roof

BY HARRY C. SPILLMAN

As a result of a very careful analysis of industrial establishments throughout the country, the new Detroit plant of the Continental Motor Mfg. Company is modern in every detail including handling and routing of material, future growth, short cuts in operation and healthful working conditions for the employees. The buildings have 240,000 sq. ft. of manufacturing floor space and are constructed on the trussed concrete principle, which gives practically one mass of windows. The factory consists of seven buildings, building No. 2 being the main structure. This is a two-story, reinforced concrete building, the first floor of which houses the assembly department, while the second floor is given up to the toolroom and general offices. Building No. 3 is of the same construction, the first floor containing the finished stockroom and the second the subassembly department. Building No. 4 takes in the rough stock and receiving rooms, and building No. 5, which is of steel sawtooth construction, contains the machine shop. Building No. 6 is a one-story steel structure with a monitor roof and contains the engine testing room and shipping department. All of these buildings are connected together as shown on the plan reproduced in Fig. 1, which makes the entire factory, with the exception of buildings Nos. 7 and 8 under one roof. This has a great advantage, as it allows the product to be trucked from one building to another without passing through the yard. Building No. 7 houses the heat treating department, which was illustrated in *The Iron Age*, January 2, 1913, and is a separate structure of the same design as building No 6. Building No. 8 is the powerhouse which is connected to all the other buildings by a tunnel, 8 ft. wide and 7½ ft. high, which is shown in Fig. 9. One side of the tunnel is given over to steam, air, water and gas piping, while on the other are located the electric wires, which are all placed in steel conduits.

Future growth is very carefully considered, and the entire plant can grow to many times its present size without interfering with the original plans or rearranging the departments. The factory is free from brick or solid partitions, and instead, heavy wire screens extending to the ceiling and having a metal dado, 4 ft. high, separate the machine shop from the receiving room, rough and finished stockrooms and from the tool cribs. This scheme gives a maximum amount of light and air, and also an unobstructed view of the entire rooms. The screens are made up in standard widths of 4 ft., which permits the partitions to be taken down easily. Articles descriptive of the factory equipment details and the testing room appeared in *The Iron Age*, March 6 and May 1, 1913, respectively.

The machine shop is housed in a sawtooth building. The roof trusses are supported on 8-in. steel columns of H cross-section, spaced 20 ft. on centers with an additional truss between each column, supported on a 15-in. I-beam, which is connected from column to column. This gives the column spacing of 20 ft. and a truss every 10 ft. The bottom chord of the trusses is made of two 4-in. channels with a 1-in. space, which allows the line shafting to be supported directly from the trusses.

The heating is by a system of air ducts built in the roof, with branches near the ceiling, which keeps the heating ducts out of the way of shafting and piping. The fan pulls the heated air around the miter steam coils, which have cold water circulated through them during the hot weather, and by operating the fans, the machine shop can be kept below 75 deg. in the hottest weather. Further ventilation is secured by opening the glass in the skylight which extends the full length of each bay, and is operated by the Drouvé continuous sash system.

The floor consists of a 6-in. bed of concrete having wooden sleepers every 2 ft. and this entire concrete slab is covered with a heavy coating of tar. On this are laid 1¼-in. pine boards nailed to the wooden sleepers. A covering of tar paper is placed on top of this, and a maple floor of 1⅛-in. boards, having a 2-in. face, is laid on top of it. This arrangement gives a floor possessing sufficient strength to support the heavy machinery without separate foundations. The double floor allows machinery to be held in

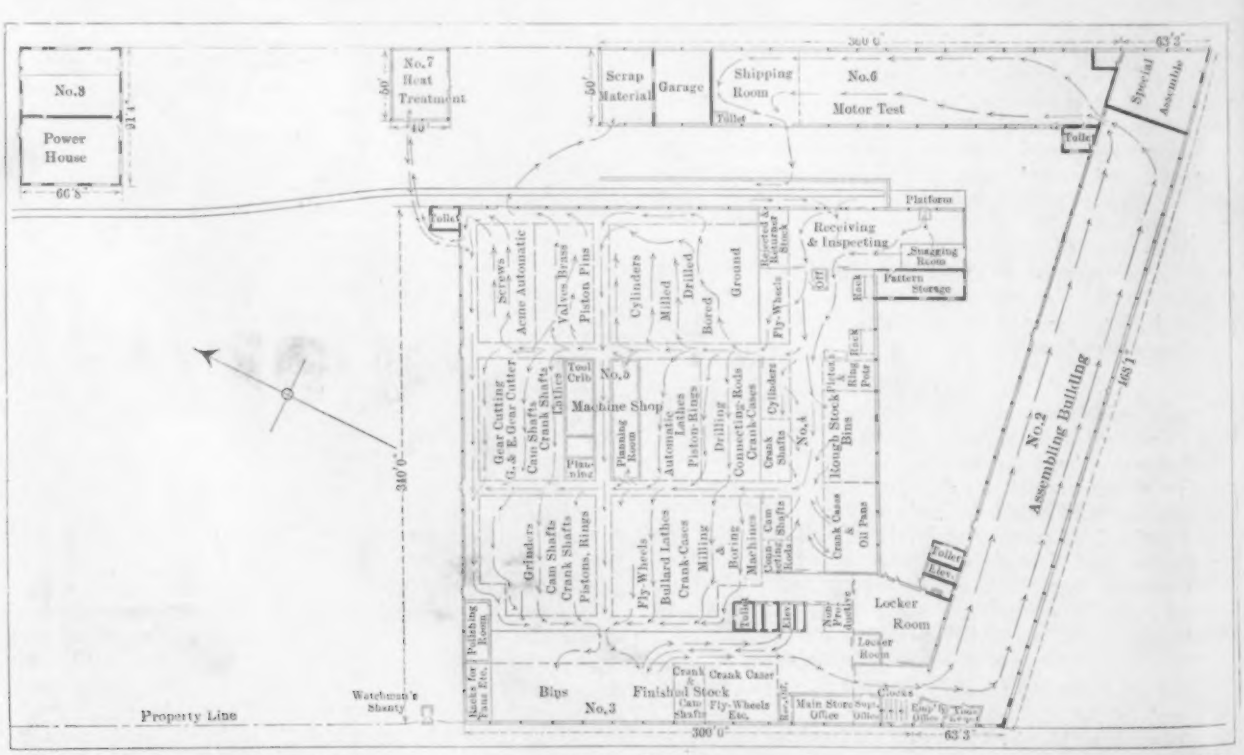


Fig. 1—Layout of the New Detroit Plant of the Continental Motor Mfg. Company. The Arrows Indicate the Course Taken by the Different Parts

Fig. 2—View of the Bullard Vertical-Spindle Milling Machine Used for Facing the Flywheels

Fig. 3—The Four-Spindle Foote Burt Cylinder Boring Machines and the Specially Designed Truck and Carriage for Carrying the Portable Jig in Front of the Moline and Baush Gang and Multiple-Spindle Drilling Machines

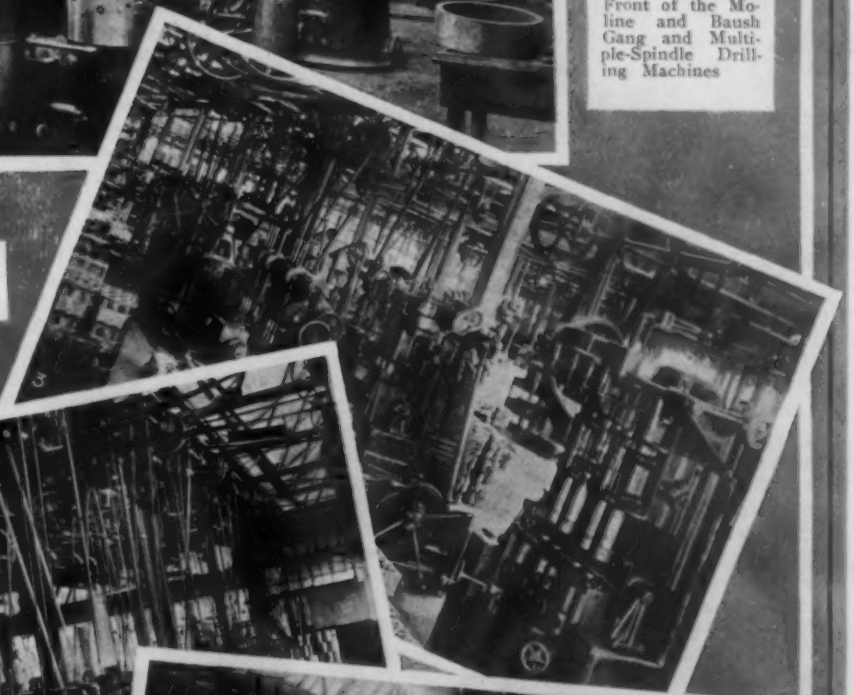
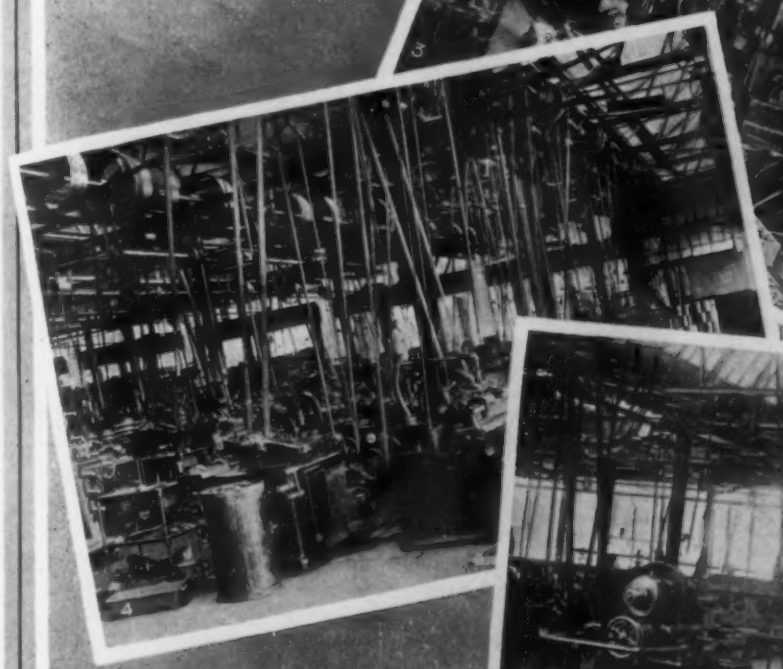


Fig. 4—The Grinding Department Working on Cam and Crank Shafts



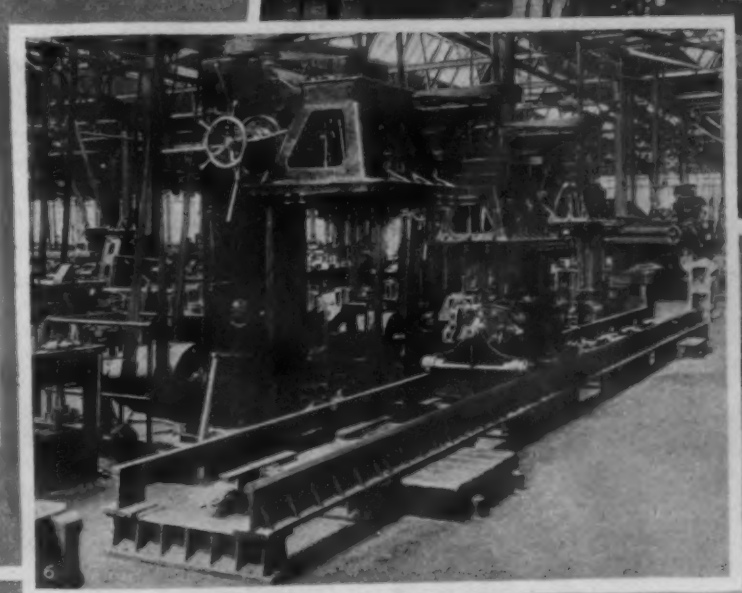


Fig. 6—View of the Multiple-Spindle Drilling Machines in the Crank Case Department with a Specially Designed Truck and Jig Mounted on a Carriage

Fig. 5—View of the Heald Grinding Machines

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

place easily with lag screws, and the maple floor is easy on the men, not causing fatigue, as a concrete floor does. This construction also makes a very easy floor to keep clean. The entire room is painted a light pearl gray, which adds to its appearance and enables the machine shop to be illuminated with Cooper Hewitt lamps, having 50-in. tubes, no other illumination being required. All the driving motors are 20-hp. units running at 1140 r.p.m. and are mounted on metal platforms located near the ceiling. They are controlled from the balcony where they are under the full authority of one man. All electric wires are run in steel conduit which protects them against the customary rough shop usage. All racks, stands and other equipment are made of black enameled steel, there being no wood equipment in the machine shop. Hyatt roller bearings with Woods type hangers having a 20-in. drop are used throughout, the hangers being bolted directly to the roof trusses. All the shafting is 2-7/16 in. in diameter and runs at a speed of 240 r.p.m. Cast-iron split pulleys are used on all shafting, and the entire equipment throughout the factory has been standardized which greatly assists in making quick repairs.

All the work of the machine shop is controlled by the planning department, which makes out work cards according to the production schedule. This department also has full supervision of the rough and finished stores and the trucking of material. The planning room is located in the center of the machine shop, and across the aisle are the tool cribs and tool repair department. All work is planned from this room and it is impossible for a workman to start a job without a work card.

Careful study has been given to the kind of trucks used, and each truck is designed for the work it is intended to perform. Small parts are placed in steel barrels, having two lugs which can be picked up and carried easily on a special carriage. Cowan trucks having specially designed platforms for holding material are used in the crank and cam shaft departments, but Reynolds trucks are used for trucking crankcases and oil pans, and a small two-wheel carriage with metal tongs picks up a cylinder casting when it is transferred from one department to another.

The routing of material has been given a great amount of study, and the machinery was located after a large number of charts and plans were made showing the different operations, floor space of machines and floor area for operations and material. Each department performs the complete machining operations on all parts taken care of by that department, so that the parts are ready for final inspection when they leave. As an example of how efficiently this system works out in the cylinder department the cast-iron cylinders, which are cast three and four en-bloc and are the heaviest parts handled in the stockroom, pass directly from the receiving room to the rough inspection department, where the general inspection for size, thickness of metal, etc., takes place. Special care is taken to see that the castings are free from sand and rough spots, and that the interior of the water jackets are sand blasted and carefully scraped. From the inspection department they are taken into the rough stockroom. The cylinder department is located within a few feet of the storeroom, and the castings are delivered to No. 4 Cincinnati milling machines, where the cylinders are mounted on the table and one side faced. Large four-head Ingersoll milling machines, with long tables, are located adjacent to the other machines. Six cylinders are placed on each bed of the four-head machines, and the remaining three sides are faced in one operation. Directly opposite these machines are the large four-spindle Foote-Burt boring machines, equipped with the jig bolted to the bed, which bore out the cylinders. Placed next to these is a line of Moline and Baush gang and multiple drilling machines. These machines have a track in front and, by utilizing a cleverly designed jig mounted on a small car, the cylinder can be dropped into this jig and passed from one machine to another without resetting the casting. A view of the Foote-Burt machines and the track and carriage for handling the portable jig is given in Fig. 3.

The reaming and tapping operations are taken care of by a line of Baker Bros. and Cincinnati single-spindle drilling machines which are located directly back of the multiple and gang drilling machines. The final operation of grinding the cylinders is done on Heald No. 6 internal eccentric grinding machines, placed opposite the single-spindle drilling machines. These grinding machines have a common exhaust system located in a trench, which carries off all the dust and delivers it to a large receiver. A view of these grinding machines is given in Fig. 5. Upon the completion of the grinding operation, the cylinders are cleaned and passed into the finished inspection department. All of these operations are performed within 60 ft. of the rough stockroom. All the machining is done on the cylinders with very little trucking and handling, which not only helps to increase production but also allows the superintendent to know at a glance exactly what the department is doing.

The same care has been used in laying out the other departments. The crankcase department has a series of multiple-spindle drilling machines in a row with a track in front, as illustrated in Fig. 6. A jig mounted on the carriage can be turned in any desired direction and permits the drilling to be done on all four sides and both ends without handling the crankcase. A pneumatic hoist takes the case out of the jig and substitutes another, which shortens the time of changing cases. The carriage automatically locks in any desired position and also stops at fixed points on the track directly under the machine. The roughing cut on the crankshaft is taken by a LeBlond special heavy duty pin lathe. The flywheels are faced by Bullard vertical-spindle milling machines, as shown in Fig. 2. The connecting rods are reamed on a special Cincinnati eight-spindle gang drilling machine which takes care of four connecting rods simultaneously, and all cam and crank shafts are ground on Norton and Landis grinding machines, a view of this operation being given in Fig.

Fig. 7—View of the Assembly Room Showing the Portable Trucks Used for Assembling the Motors

4. All the drilling and reaming operations are done with accurately designed jigs, all parts interchangeable.

The inspection in the plant is very thorough, the material is carefully inspected in the rough stockroom, both for quality and dimensions, and there are numerous other inspectors throughout the plant, who inspect each part between machine operations. The product is also given an exhaustive test after machining before passing into the finished stock department, this work receiving careful attention under the direct supervision of the engineers. It is impossible to bring any material into stockroom or on the assembly floor without passing through the inspection department, due to the layout of the main trucking aisle, which runs from the machine shop directly through the inspection department to the finished stockroom. The motors are also inspected during assembling and receive a final inspection before the shipping is done under the supervision of the sales department, which is entirely independent of the general inspection and production departments. This allows two separate sets of inspectors under different department heads to discover any parts that are not up to standard. The inspection department insists upon accurate work, a 90 per cent. bearing surface uniformly distributed being demanded for each bearing, and the reaming is so accurately done on the crankcases and the crankshafts are held so close to size that only scraping is done for finishing to size.

Material is bought under signed specifications. All the material is tested in the factory laboratory and also at outside testing laboratories to give a careful check on the results, and any material not coming within the specifications is rejected.

The assembly room, which is illustrated in Fig. 7, is located close to the finished storeroom, so that the finished stock can be assembled without a large amount of trucking. Progressive assembling is used, one man specializing in each separate operation. The assembling of the motor is started on a small truck near the finished storeroom, and passes from one operator to the next until it reaches the other end of the assembly floor. When it reaches this point it is completed and is ready for the test up by an electric crane and placed directly on a test stand. room, which is located only a few feet away. It is picked

All the jigs, fixtures and special cutters are made in the toolroom, one end of which is illustrated in Fig. 8. The machine tool equipment in this department is very complete and almost any kind of a complicated job can be taken care of. It is common practice to have 500 to 1000 special cutters of one kind made in this department at once.

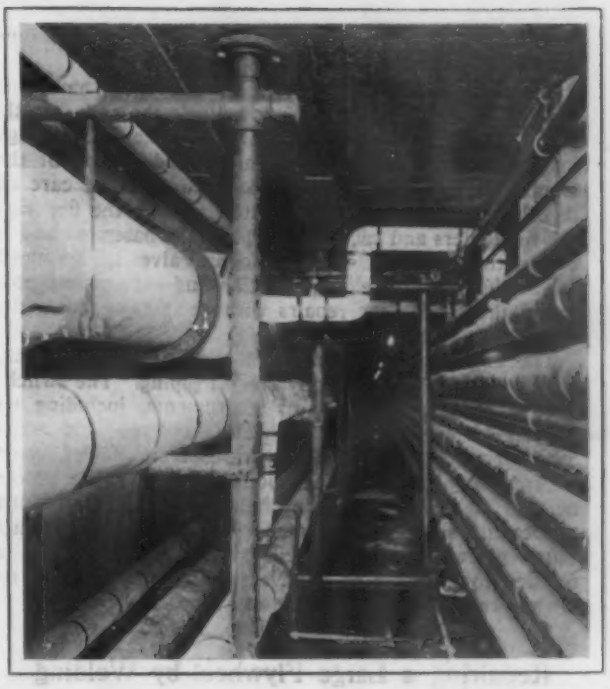


Fig. 9—The Tunnel Connecting the Powerhouse with the Various Buildings. The Piping is Located on One Side and the Electric Cables Run in Steel Conduits Along the Other

The powerhouse possesses many features seldom found in factory power plants. The entire building is fireproof, having steel sash and reinforced concrete floors. The engine room, which is spanned by a 15-ton Shaw hand crane, has a red tile floor and white enameled side walls. Power is furnished for the entire plant by cross compound Hamilton Corliss and Erie Ball engines, each of which is connected to a three-phase, 60-cycle, 220-volt, alternating-cur-

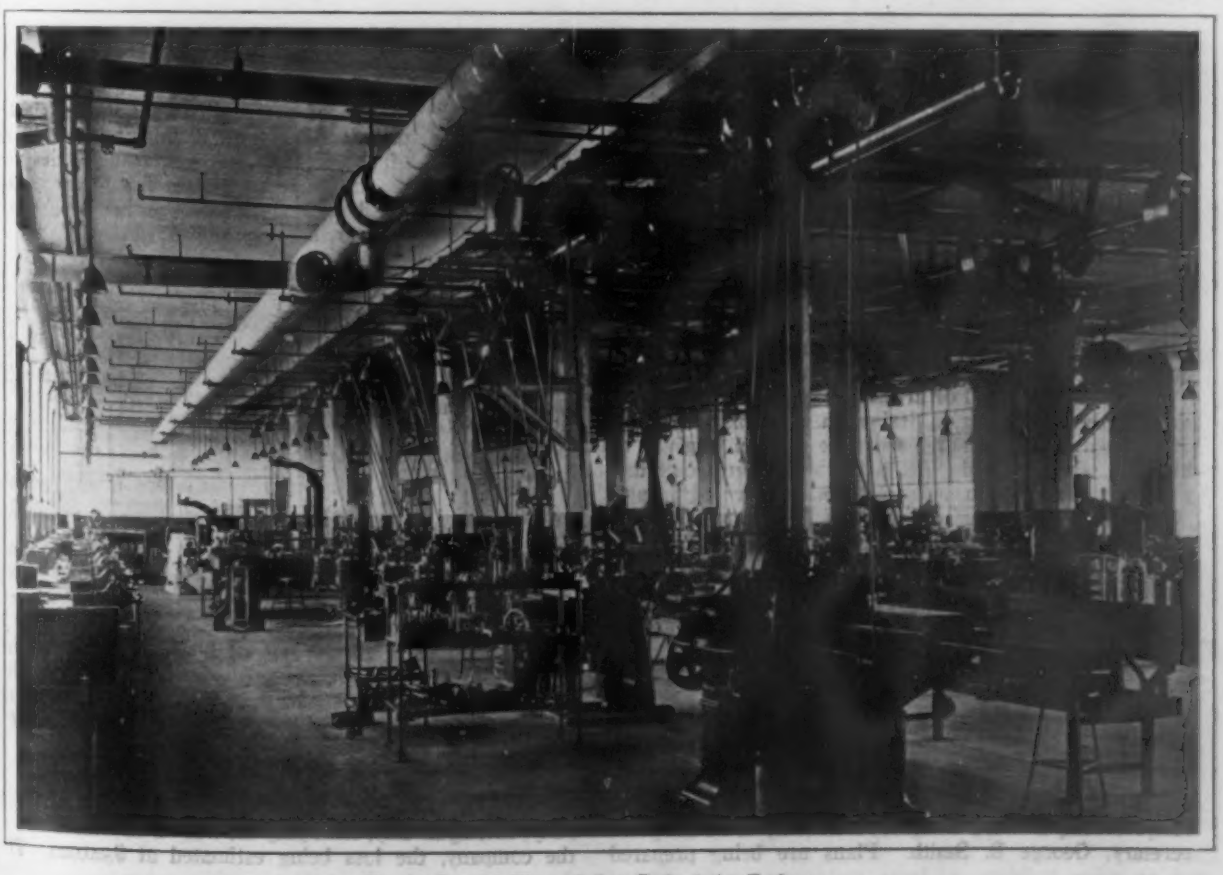


Fig. 8—General View of One End of the Toolroom

rent generator. Three 250-hp. Wickes vertical water tube boilers with Murphy stokers supply the steam.

A Shaw monorail electric coal conveyor, having a 1000-lb. Brownhoist grab bucket, unloads the coal directly from the cars and conveys it either to the coal storage bins or directly to the metal bins located on top of the stokers, a switch enabling the conveyor to take care of the ashes. The steam header extends along the fire wall near the boilers and each end drops to the basement and is tied together to form a complete loop. Valves are arranged to feed the steam in either direction and cut out any portion of the header for repairs without shutting down the plant.

The engine room piping is located in the basement, which keeps the room entirely free of piping. The switchboard has a complete set of instruments, including an ammeter for each phase, an indicating and recording wattmeter for each generator, a synchroscope and power factor and frequency meters. Each building has its own power line, and the power factor and indicating wattmeter which are located on a swinging bracket can be connected to any desired power line by a special switch. A connection is provided to the lines of the Detroit Edison Company, so that power can be obtained at any time.

Repairing a Large Flywheel by Welding

A large flywheel which was broken in four places has been successfully repaired by the Holyoke branch of the Autogenous Welding Equipment Company, 531 Main street, Holyoke, Mass. This flywheel formed a part of an engine installed at the No. 2 mill of the American Thread Company in that city and was dropped while the engine was being moved from one of the mills, with the result that one spoke was entirely broken out and two others cracked. The cost of the new wheel would have been $4800 and as there would also have been considerable delay in securing it, it was decided to try to repair it by welding.

The work was carried out in one day and the wheel was welded from both sides without turning it over. This is a somewhat remarkable performance, as welding from the under side is a difficult operation on gray iron. Before putting the spokes back in place in the wheel, the welds were tested by jarring and the engine was run at a higher rate of speed than normal without the belt for the same purpose. When the wheel was placed in operation, it was found to be true within a reasonable degree, being no more out of round than is customarily the case with large wheels.

Tests made by this company on welds made in cast iron, by both the transverse and tensile methods, have resulted in the test pieces breaking outside of the welds. These pieces were made of steel and welded together with cast iron, and the results have given a tensile strngth of 36,000 lb. per sq. in. for cast iron.

The National Tube Company, Frick Building, Pittsburgh, Pa., has recently issued a pamphlet dealing with its Matheson joint pipe. This is a system of piping for high or low pressure natural or artificial gas lines, water works, mines, hydroelectric plants, irrigation work and general engineering uses. A comprehensive description is given of this pipe, which is made with a bell and spigot joint that is very similar in appearance to the ordinary cast-iron pipe joint. There are a number of views, showing the pipe in the various stages of manufacture, as well as laid in both straight and curved lines. A table of weights and dimensions and a standard set of specifications are also included. This pipe is of course made of wrought steel, the National Tube Company having for a long time discontinued the manufacture of wrought-iron pipe.

The Atlas Crucible Steel Company, Dunkirk, N. Y., has increased its capital stock to $1,500,000 from $400,000, as voted at the annual meeting July 1. At this meeting officers were elected as follows: President, A. H. Hunter; vice-president, Edward Burgess; treasurer, C. P. Burgess; secretary, George B. Smith. Plans are being prepared for an office building, of brick and stone, to be erected at once.

May Iron and Steel Exports and Imports

The May report of the Bureau of Foreign and Domestic Commerce shows a slight decline in iron and steel exports as compared with April, in both value and tonnage. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, in May was $26,718,970, against $27,123,044 in April. The exports of commodities for which quantities are given totaled 242,192 gross tons in May, against 260,438 tons in April. Imports, on the other hand, showed a slight increase, the May value being $3,181,597, against $2,849,819 in April. Quantity imports were 28,572 tons in May and 25,742 tons in April.

Among the noteworthy changes in the exports is the decrease in steel rails from 60,306 tons in May, 1912, and 41,112 tons in April, 1913, to 32,097 tons in May, 1913. Structural iron and steel declined from 45,556 tons in April to 37,382 tons in May. Details of the exports of such commodities for May and 11 months of the current fiscal year ended with May, compared with the corresponding periods of the previous fiscal year, are as follows:

Exports of Iron and Steel

	May		Eleven months	
	1913	1912	1913	1912
Commodities	Gross tons	Gross tons	Gross tons	Gross tons
Pig iron	19,527	28,156	264,238	158,833
Scrap	7,235	10,453	97,206	75,008
Bar iron	1,005	2,563	22,145	14,302
Wire rods	8,906	6,977	69,530	42,940
Steel bars	18,200	15,772	214,841	131,175
Billets, ingots and blooms, n.e.s.	9,361	36,070	223,406	210,581
*Bolts and nuts	2,381	.....	19,456	.....
Hoops and bands	1,120	1,234	17,146	7,438
*Horse shoes	131	.....	1,070	.....
Cut nails	148	1,414	4,630	10,107
§Railroad spikes	1,112	.....	11,737	.....
Wire nails	3,734	5,448	50,703	57,872
All other nails, including tacks	376	1,114	3,980	11,536
Pipes and pipe fittings	32,498	22,797	254,036	210,742
Radiators and cast-iron house heating boilers	599	240	7,835	3,795
Steel rails	32,097	60,306	408,571	369,226
§Galvanized iron sheets and plates	6,139	20,365	108,284	166,952
§All other iron sheets and plates	2,155		29,867	
§Steel plates	21,988	33,545	241,487	250,543
§Steel sheets	12,036		121,742	
Structural iron and steel	37,382	23,137	328,901	219,534
Tin and terne plates	5,764	10,219	67,800	71,977
Barbed wire	7,488	10,604	81,420	95,176
All other wire	10,810	17,344	125,920	128,874
Totals	242,192	307,758	2,775,951	2,236,611

*Included in "all other manufactures of iron and steel" prior to July 1, 1912.
§Not separately stated prior to July 1, 1912.

In May the imports of commodities for which quantities are given totaled 28,572 tons, against 25,742 tons in April. Details of the imports of such commodities for May and for 11 months of the current fiscal year ended with May, compared with the corresponding periods of the previous fiscal year, are as follows:

Imports of Iron and Steel

	May		Eleven months	
	1913	1912	1913	1912
Commodities	Gross tons	Gross tons	Gross tons	Gross tons
Pig iron	13,795	8,047	141,663	100,967
Scrap	2,198	3,234	35,494	13,068
Bar iron	2,939	1,935	27,328	20,990
Structural iron and steel	1,398	140	6,260	2,801
Billets, bars and other steel, n.e.s.	2,138	989	18,604	21,062
Steel rails	781	308	4,427	2,989
Sheets and plates	500	86	3,557	2,312
Tin and terne plates	2,862	108	4,927	2,796
Wire rods	1,961	1,102	14,907	12,885
Totals	28,572	15,949	257,167	179,870

Imports of iron ore in May were 191,860 gross tons, against 194,482 tons in May, 1912. In the 11 months ended with May, iron ore imports totaled 2,005,284 tons, against 1,824,128 tons in the corresponding period of 1912.

The total value of exports of iron and steel, not including ore, was $279,377,451 in the 11 months ended with May, against $235,591,884 in the corresponding period of 1912. Figures for similar imports were respectively $30,344,483 and $24,096,346.

The fire at the plant of the Haskell & Barker Car Company, Michigan City, Ind., July 12, was an expensive one to the company, the loss being estimated at $500,000. The damage, however, was confined to the lumber yards and did not extend to the manufacturing plant.

Standardized Press Attachments

The Baird System of Fitting Open Back Presses to Receive All Attachments

The Baird Machine Company, Bridgeport, Conn., has developed a system under which every press built in the works is finished and fitted with the various attachments, after which it is stripped and becomes a plain machine. Consequently, if, at any time after a press has been installed in the plant of a customer it is found desirable to add an attachment such as back roll feed, automatic stop and transfer attachment, side roll feed, dial attachment, or slide feed, it can be ordered from the factory with complete assurance of perfect fit and easy application to the machine. Even special attachments are built to the same standard, so that they will align with the machined seats on the press, which are finished drilled and tapped to receive the holding screws. These details, together with the elongated shaft which carries the driving mechanisms, are clearly shown in the accompanying engraving. Under this system a plain press may be put to various uses, perhaps alternating between attachments, or changing with the product as time goes on.

The stripped press is shown above the four attachments which from left to right are the back roll feed, the automatic stop and transfer attachment, the side roll feed and the dial attachment.

The back roll feed, at the extreme left of the engraving, takes the metal from a reel and automatically feeds or draws it under the tool ready to be operated upon. The feed is in either direction, from back to back, or back to front, the metal moving any predetermined distance at each stroke. The rolls are of tool steel, hardened and ground. There are hand adjusting screws and nuts, and metal gauges. A large handwheel serves to start the metal between the rolls.

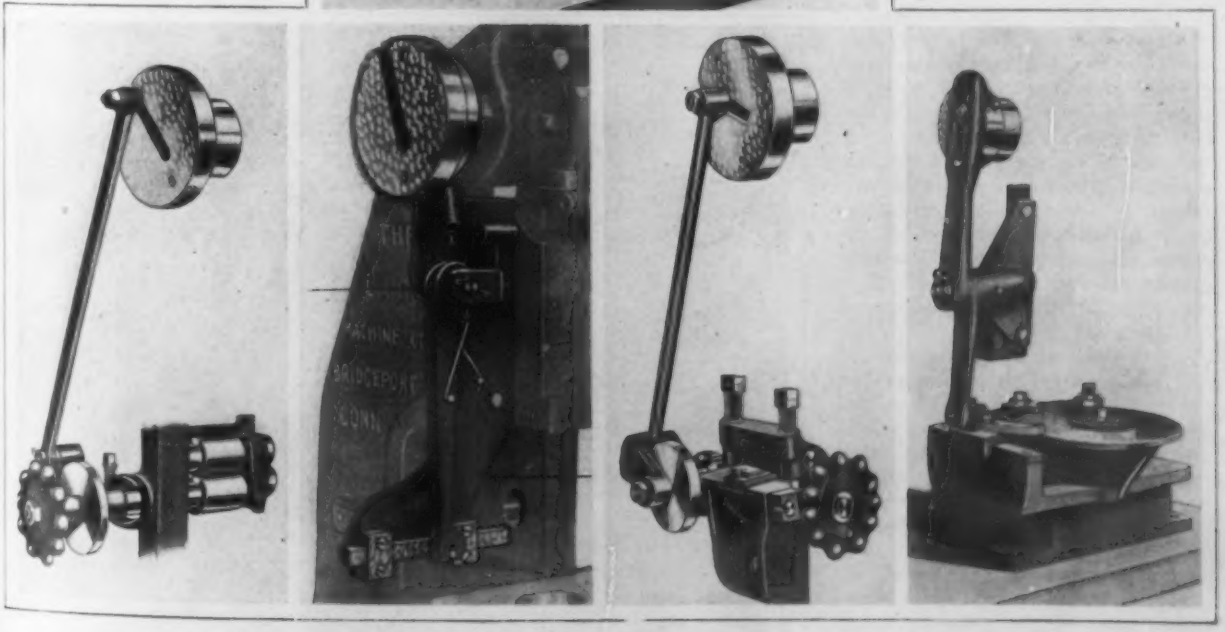
The automatic stop and transfer attachment, illustrated in the left central portion, is used in connection with the back roll feed. This device is compact, and is held by one bracket, the only other part to be removed being the cam. After the press has reached the limit of operation under regular equipment, the mechanism transfers the blank for one more operation, which arrangement may save the cost of an extra handling.

The side roll feed, which is shown next to the right end, takes the metal from a reel in the same manner as the back roll feed, but, being located on the side of the press, feeds across the bed from left to right or right to left. For certain classes of work it has advantages. It allows greater operating space for the tools, the metal travels over the greatest width of bed and punch block, and the rolls can be adjusted in relation to the bed, avoiding regrinding or blocking up should the bedplate not be of exact hight.

The dial attachment, at the extreme right, is a circular plate or dial forming the bed of the press. In it are cut cups or carrying holes, extending around the circumference. The material to be operated upon is fed into the cups, and the dial is timed to turn so that as the tool is withdrawn the finished product is carried away and new material is brought forward for the next descending stroke. This attachment handles with speed small partly finished blanks, which would be fed by hand not only slowly but also with considerable danger to the fingers of the operator. It is emphasized that for some classes of work a dial attachment will insure speed, safety of operation and a perfectly finished product.

The slide feed attachment, which is not shown, is a modification of that in the company's four-slide automatic machine. It will feed longer lengths than the roll feed. The mechanism consists of a reciprocating slide and grip.

In addition to these five so-called standard attachments, the company is prepared to work out many variations and special applications for use in connection with the operations of particular industries.



The Back Roll Feed — The Automatic Stop and Transfer Attachment — The Stripped Press — The Side Roll Feed — The Dial Attachment

VIEW OF THE BAIRD OPEN BACK PRESS AND THE VARIOUS ATTACHMENTS WHICH CAN BE SUPPLIED

Recent Improvements in Engine Design

Details of a New Type of Valve Gear and an Improved Form of Connecting Rod

The Nordberg Mfg. Company, Milwaukee, Wis., has made a number of improvements in the design of its engines. These include a new type of long range Corliss valve gear, which it is emphasized, secures the desired range of cut-off without the drawbacks of the double eccentric gear, and the other is a new type of connecting rod and rod head. Views of the new valve gear and its application to the cylinder of a Corliss engine are given in Figs. 1 and 2 respectively, while Fig. 3 illustrates the rod end and the boxes of the crank end of the connecting rod.

The arrangement of the drop arm, valve arm and hook is practically the same as in the company's standard gear but there is one essential difference. In the new gear, the

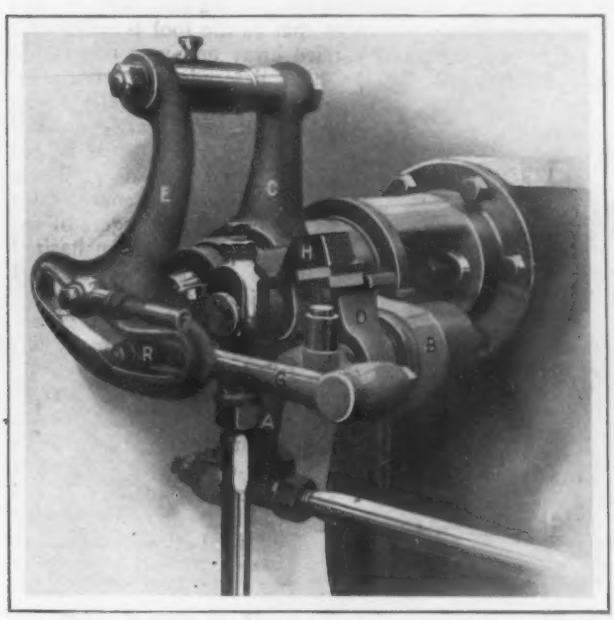


Fig. 1—The New Nordberg Long Range Corliss Valve Gear

hook D, Fig. 1, is positively thrown in and out of engagement with the drop H, by a lever, G, which terminates through a roller, R, in an oscillating cam, E. This cam is hung on an extension, C, of the valve arm, A-B-C, and has two concentric circular slots, the center of which is the joint of suspension of the cam. A transition slot joins the two circular ones and as the roller passes from one slot to the other, the hook is released or engaged. The cam E is oscillated about its point of support through a cut-off rod, F, which receives its motion from a separate eccentric, the throw of which corresponds to approximately the length of each circular slot. If the engine is running below normal speed and the governor is resting on the collar, the roller remains in the lower slot, the hook steels remain in contact and steam is admitted for the full stroke of the piston. When the engine is operating at its normal speed with no load, the governor is in its highest position and the roller remains in the upper slot of the cam. At this time the trip steels remain disengaged and no steam is admitted to the cylinder. From this it will be seen that the point of cut-off coincides with all the intermediate positions taken by the governor which changes the center of oscillation of the cams between the two limits stated.

The center of oscillation of the cams, it is pointed out, is controlled by the governor in such a way as to free it from any reaction due to the movement of the knock-off eccentric. To secure this result, the motion of the governor and the eccentric is transmitted to the cams through the mechanism illustrated in Fig. 2. This consists of a parallelogram whose main lever A is supported by a

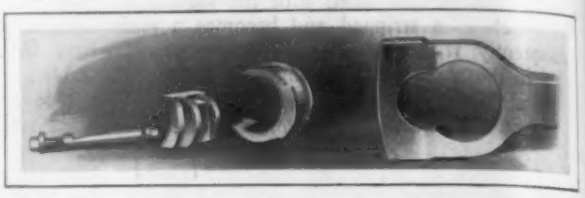


Fig. 3—Rod End and Boxes of the Crank End of the Connecting Rod

bracket on the governor, which is free to swing about the point P and is driven by the knock-off eccentric rod E. At the bottom end of this lever is hung the three-armed lever K. The two vertical ends of this lever are connected to the knock-off cams and the horizontal arms connected by a rod parallel to the main lever A, the upper end of which is connected to the governor at the point R. As this parallelogram is oscillated by the knock-off eccentric drive rod, it is apparent that its sides must remain parallel and the lever K always moves in a position parallel to itself. If, however, a change in load occurs, the governor then lifts or lowers the point R, thus changing the angularity of the lever K and the center of oscillation of the cams and the point of cut-off.

The connecting rod, illustrated in Fig. 3, is so designed that the boxes cannot pinch the pins. In this engraving the various parts of the rod have been separated. The stationary box is cylindrical and is fitted into the bored eye of the rod. The adjustable box is slightly narrower than the diameter of the pin and fits into a recess in the rod. One side of the stationary box is cut away to form a slot through which the adjustable box projects, its concave surface bearing against the pin. In this way, it is pointed out that by having the adjustable box fit into the lateral opening in the stationary box, pinching is prevented and the whole box is prevented from taking the revolving motion of the crank pin. The key or wedge by which the adjustment for wear is effected is a cylindrical block of steel, one side of which is cut away to form a plane surface inclined to its axis. This surface bears against the corresponding inclined surface on the adjustable box while the wedge itself fits closely into a reamed hole in the end of the rod. The movement of the wedge is effected by cap screws checking each other.

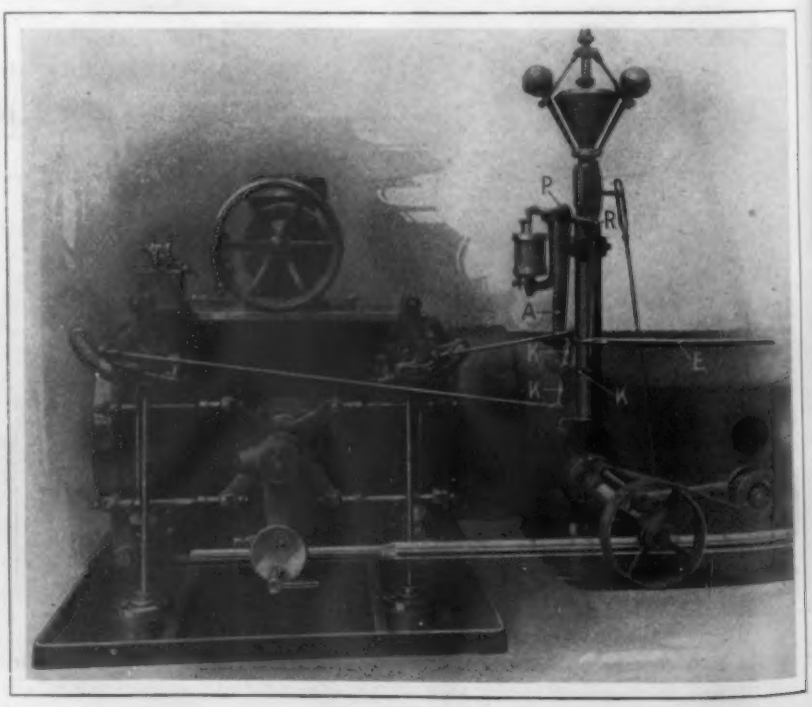


Fig. 2—Cylinder of a Corliss Engine Showing the Long Range Valve Gear and the Governing Mechanism

The construction of the boxes at both ends of the rod is practically identical, the only difference being that the wedge at the crank end is placed vertically, while the one at the cross-head end is placed horizontally to render it more accessible for adjustment. The crank pin boxes can be removed from the rod without taking the rod off the crank pin. This is accomplished by first removing the adjustable box and then giving the stationary box a half revolution. The crank end boxes are made of steel and lined with babbitt, while those for the cross-head end are made of hard phosphor bronze, the rod itself being forged of open-hearth steel. As the direction of adjustment is the same at both ends, it is pointed out that this tends to keep the length of the rod constant.

Automatic Regulation of Superheat

It is possible to control the temperature to which steam will be raised in a superheater of a given design in two ways. The first of these is to regulate the volume of steam passing through the superheater tubes so that after it has been mixed with saturated steam from the boiler the mixture will have the desired superheat, while the other depends upon the regulation of the amount of hot gases passing over the superheater tubes so that the desired steam temperature will be obtained for any weight of steam passing through the tubes. The second is the method employed by the Heine Safety Boiler Company, St. Louis, Mo., in its superheater. Fig. 1 illustrates the arrangement of the automatic temperature regulator employed in connection with the superheater, while Fig. 2 is a front and a longitudinal elevation of the automatic temperature regulator and superheat damper control as applied to a larger boiler having double superheaters.

In addition to illustrating the arrangement of the superheater to obtain the temperature regulation by the control of the flow of hot gases, Fig. 1 also shows the automatic control apparatus. The superheater is located at the side of the boiler drum in a firebrick chamber, which forms part of the boiler setting, and the rear of the chamber communicates with the furnace by a flue. A small percentage of the furnace gases rise through this flue, make two passes over the superheater tubes and then flow out to the front at the bottom of the superheater chamber, where a damper is located. The opening of this damper is controlled by an automatic temperature regulator, so as to keep the superheat constant. This regulator consists of two parts, a diaphragm lever, *a*, actuated by compressed air, and a thermostat controller, *b*, which regulates the admission of compressed air to the diaphragm lever, according to the temperature of the steam.

The diaphragm lever is suspended from a beam, the outer end of the lever being in line with the damper rod and connected thereto by a link. Air enters the top of the diaphragm chamber, which is a convex casting with a rubber diaphragm across the bottom. Springs hold a saucer against the diaphragm, the saucer itself being recessed to hold a link connecting with the lever. If there is no air pressure in the chamber, the springs press the saucer against the diaphragm and hold it against the inside face of the diaphragm chamber. The admission of air builds up pressure which overcomes the resistance of the springs and causes the saucer to move downward with a corresponding movement of the lever and damper. The thermostat controller for regulating the supply of compressed air to the diaphragm lever is installed in the outlet line of the superheater with an inwardly projecting thermostat. This

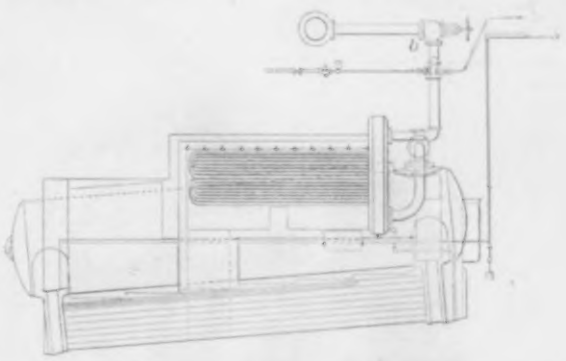


Fig. 1—The Arrangement of the Automatic Regulator with the Heine Superheater

thermostat consists of two tubes, one of a metal that changes its length considerably as the temperature varies, so that changes in superheat produce a corresponding change in the relative length of the two tubes. This motion causes changes in the opening of a small ball valve which controls the supply of compressed air to the diaphragm lever.

Fig. 2 illustrates the arrangement of the automatic temperature regulator for a boiler, on which two superheater units are installed, one on either side of the setting. In this arrangement there are two dampers to be controlled, and these are linked together. The diaphragm lever *a*, in this case, is fastened directly to the cornice of the boiler front, thus making the whole outfit self-contained. The controller *b* for admitting air to the diaphragm lever is located at the junction of the superheater outlet pipe from each of the units.

Among the advantages claimed for the use of control apparatus with superheaters is that the temperature may be changed as often as desired after the plant is installed. The thermostat controller has a small dial and adjusting screw by which the mean temperature maintained may be raised or lowered as much and as frequently as is desired. In this way it is possible to operate the plant for a given length of time at 50 deg. superheat, and also at another figure such as 75 and 100 deg. By keeping a record of the load carried and the amount of coal consumed during the various periods, it is possible to determine the most economical working conditions.

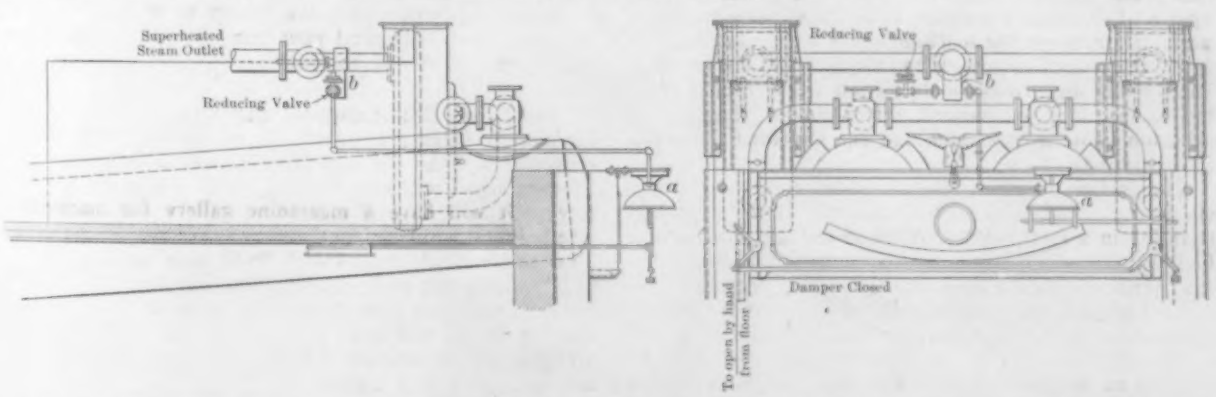
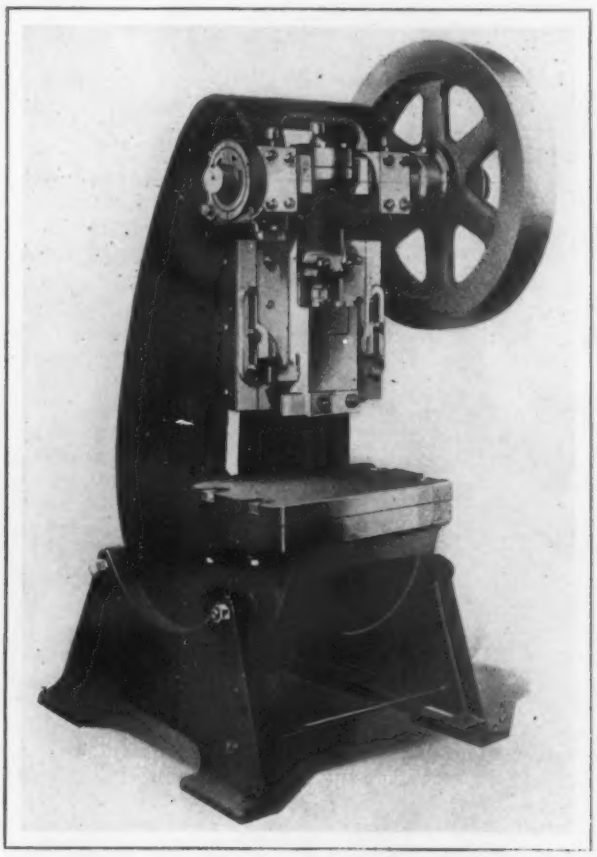


Fig. 2—The Automatic Temperature Regulator and Superheat Damper Control on a Large Heine Boiler with Double Superheaters

An unusually large lifting magnet has recently been designed and built by the Witton-Kramer Electric Hoist & Tool Company, Witton, Birmingham, England. It is to be used for unloading iron ore from ship's holds and for loading pig iron into charging boxes. In ore handling it is expected to eliminate many non-magnetic impurities. The magnet weighs 55 cwt. and has a diameter of 52 in. It will lift an average of 17 cwt. of ore and 35 cwt. of pig iron. It has a new device for increasing the volume swept by the magnetic field.

A Heavy Pattern Open Back Power Press

A new heavy pattern open back inclinable power press has been brought out by the Cleveland Machine & Mfg. Company, Cleveland, Ohio. It is one of an extensive line of presses of various types that will be built by this company, and is designed for work with blanking, forming and combination dies on a large variety of sheet metal work.



A New Heavy Pattern Open Back Inclinable Power Press Designed for Use in Connection with Blanking, Forming and Combination Dies

This press, which is known as the No. 8 power press, is capable of exerting a pressure of 60 tons. The important special features of the machine are a safety latch in the clutch, the type of knock-out and the inclining device. The frame is unusually deep in its section from front to back, thus giving, it is emphasized, the minimum of spring or deflection under a maximum load and obviating the necessity of tie rods.

The inclining device consists of a worm and worm-wheel conveniently mounted in the back of the press and operating in a steel rack mounted on the leg, as shown in the illustration. The frame pivots on the front studs in the legs so the working hight of the bed is not materially changed when in the inclined position. One man can easily adjust the press to the inclined or straight position.

The clutch is of the pin type, the special feature of which is an automatic latch. The rectangular clutch pin, which is set in a steel collar forged solid on the shaft, has a safety latch which automatically locks the clutch pin so that it is impossible to trip the press with the treadle when the shaft is turned down in position for the purpose of setting the dies.

The slide is provided with a knock-out bar which is operated by two adjustable plates mounted on the front of housing on each side of the slide. These plates can be tightened to suit the work in hand and adjusted to slip under an overload which would cause some part to break if the adjustment was positive.

The brake band consists of two halves clamped together with a screw spring, the band being adjusted under the tension of the spring which automatically compensates for wear and for the expansion due to heat when the press is running continually.

The crankshaft bearings in the frame and the flywheel bearings are bronze bushed. The crankshaft is of high carbon open-hearth steel 3½ in. in diameter in the frame bearings and 3⅞ in. in diameter in the connection, this being 25 per cent. greater section than the body of the shaft. The main and the connection bearings are each 5½ in. long.

The following table gives the principal dimensions and specifications of the press:

Stroke of slide, in.	2
Adjustment of slide, in.	3
Size of bottom of slide, in.	6½ x 7
Distance from center of slide to back, in.	9½
Distance from bed to slide with stroke and adjustment up, in.	11
Depth of bed, in.	18
Width of bed, in.	27
Depth of hole in bed, in.	12
Width of hole in bed, in.	16
Distance between uprights, in.	14
Thickness of bolster plate, in.	2
Speed, r.p.m.	90
Diameter of flywheel, in.	36
Face width of flywheel, in.	5½
Weight of flywheel, lb.	800
Over-all hight, in.	85½
Floor space required, in.	48 x 48
Weight of press, lb.	4,400

The construction of the lower end of the slide is such that changes from one kind of die to the other can be easily made as often as may be desired.

The Recovery of Values from Old Foundry Sand

In the past two years a number of plants in different parts of the country have attempted to recover the values in waste foundry sand. Both dry and wet processes have been used in experimenting. No one manufacturer makes all the equipment necessary for a complete plant of this kind, and this has delayed the development of the best methods. In Detroit the waste sand problem has become acute, in that the railroads at certain seasons of the year refuse to take sand from the foundries unless the latter will bill it to a definite place and unload it.

On Tuesday evening, July 15, a group of Detroit foundrymen met to discuss this problem. A number of them had already had conferences with equipment manufacturers, and the result is that a series of tests will be undertaken, financed by foundrymen in different parts of the country and by the manufacturers of equipment. A complete plant for treating sand either by dry or wet process, for re-bonding old sand for use as molding sand and for the treatment of new sand to increase its value will be installed in the laboratory of the H. M. Lane Company, Detroit. It will have a capacity of about 15 tons of sand per day. The tests are expected to take five or six months. Arrangements have been made by which foundries interested in this subject can have their sand problems worked out in connection with this work. It is stated that preliminary tests seem to indicate that 70 per cent. of the old sand now being carried to the dump can be recovered and re-used.

The E. W. Bliss Company, Brooklyn, N. Y., owing to the greatly increased volume of its business and of the continued demand for very large presses of its design, has let contracts for a new erecting shop, 129 x 200 ft., one story. It will have a mezzanine gallery for machinery. The building will be of steel construction, faced with brick. Two 40-ton Shaw cranes with 80-ft. span and one 15-ton Shaw crane with 41-ft. span will be installed. The erecting shop will have 44 ft. head room under the roof trusses, and the cranes will have a head room of 44 ft. over the erecting pits. Contracts for the entire machinery equipmen have also been signed.

The H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York, furnishes an interesting statement of the manner in which one of that company's asbestos roofs checked the progress of a serious fire at Charlestown, Mass. The fire was spreading rapidly, with numerous falling embers and sparks, and would have caused an extensive conflagration but for the fact that the building with the asbestos roofing formed an effectual fire break.

Pig-iron production in Russia in 1912 was the largest on record, being 4,118,000 metric tons, or 593,000 tons greater than in 1911. The steel ingot output for 1912 exceeded that for 1911 by 400,000 tons, being 4,418,000 tons.

A toy company at Sheboygan, Wis., started out to use only the waste wood from local sawmills. It has worked out a system of using all small waste pieces so that practically nothing but the sawdust is lost.

Sand Blast Machine with Novel Features

The Use of One Oscillating Nozzle a New Departure in a Device of the Barrel Type for Cleaning Castings

A sand blast machine of the barrel type for cleaning small and medium-sized castings and doing kindred work, which embodies several features new in design, is being manufactured by the De La Vergne Machine Company, Mott Sand Blast Department, New York. For the new device, the simplicity of which is apparent from the illustrations, is claimed great economy of air and general efficiency of operation. It is entirely self-contained and skilled labor is unnecessary in its operation. The application of the air is by only one nozzle, as may be seen in the central portion of the accompanying engraving. The nozzle oscillates on the line of the axis of the barrel and throws the blast and grit along a line coincident with the axis. The movement approximates the moving of a nozzle steadily back and forth by hand, the air and grit being directed at the work instead of the work being brought under the blast. By this arrangement cleaning is accomplished with one ¼-in. nozzle and surfaces are reached which otherwise would require several nozzles.

The barrel is made of one piece of 5/16-in. steel boiler plate and built within two heavy cast-iron rings which support it and in turn are supported by four cast-iron flanged wheels on which the barrel revolves. The barrel is perforated in such a manner that it serves as a screen, the abrasive material falling through and converging in a hopper under the barrel. From the hopper it is drawn by suction through a feed hose to the nozzle and used over and over again. In first starting the machine, after the power is connected, all that is necessary is to place grit in the hopper. The barrel is closed at the operating end by a sliding clamp door which revolves with the barrel and can be opened when the latter is at any position. About a quarter turn of a small handwheel unlocks the door which is carried on a trunnion bearing which in turn is supported by a bracket on the case.

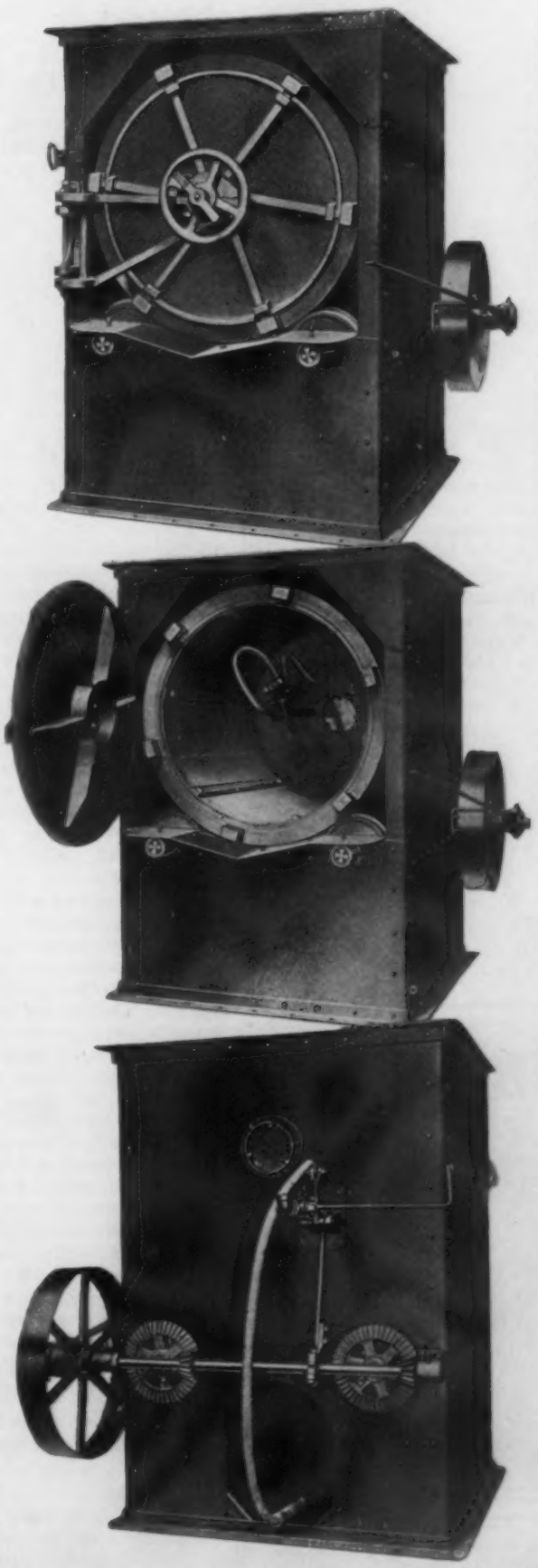
The case is constructed of 3/16-in. steel plates riveted at the corners to a 2½-in. extra heavy angle iron which is carried around the top and bottom. At the work end of the barrel is a shelf which enables the cleaned castings to be raked from the barrel into a wheelbarrow.

The flanged wheels supporting the barrel are keyed to 2-in. shafts which run in boxes attached to and outside of the case and which are driven by wide-faced gears meshing with beveled pinions as shown herewith. The shaft carrying the pinions is driven by a jaw-clutch pulley 24 in. in diameter with a 3-in. face. The speed of the pulley should be 24 r.p.m., giving a speed of 2 r.p.m. to the barrel. Owing to the slow speed it is pointed out that delicate castings with sharp corners are not injured, as the revolving of the barrel is solely for the purpose of presenting all sides of the stock to the blast.

The oscillation of the blast nozzle is obtained from an eccentric keyed to the driving shaft and it and the attached mechanism can be seen in the lower portion of the illustration. The oscillating feature is interesting in its operation as well as important from the viewpoint of economical use of air. The feed is accessible, as may be seen from the view of the rear of the machine.

A 6-in. hole to which may be attached a pipe running to an exhaust fan is located near the top of the back of the case. Where an exhaust fan is used the dust can be discharged in the outer air, through a chimney or otherwise. The operation of the mechanism is controlled from the work side of the machine by one lever for opening the air valve and another for operating the jaw-clutch pulley. The pulley can be placed at either end of the drive shaft to suit convenience, though it usually is placed at the right-hand side. All of the bearings of the machine are outside of the case and protected from dust and grit.

In its own plant the manufacturer has cleaned phosphor bronze crankshaft boxes weighing 60 lb. each, although



Views of the Front, Interior and Rear of the Mott Sand Blast Machine with One Oscillating Nozzle for Cleaning Small and Medium-Sized Castings

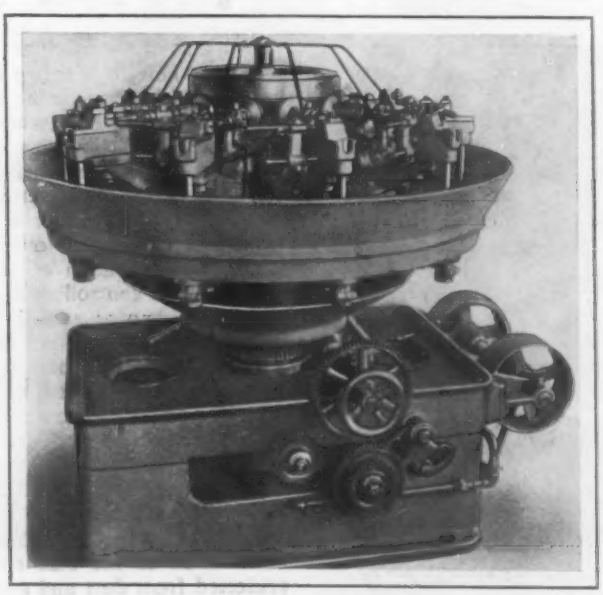
the machine is not recommended for such large work. Under tests there also have been cleaned drop forged steel hooks for galvanizing and the results were pronounced very satisfactory by the platers. The use of angular grit is recommended. The machine in tests conducted by the maker has thoroughly cleaned cored brass castings in 200-lb. lots in 3 min., gray iron in 4 to 8 min., and removed the scale from malleable tees in 10 to 15 min. It has operated successfully on brass castings at 40-lb. pressure, the manufacturer asserts, but about 80 lb. is advocated, as better results are then assured. The use of long nozzles is advised, as the sand then impinges with greater force on the work and consequently the cleaning is done more rapidly. With bulky pieces, however, short nozzles may be used, thus giving greater clearance between the shell of the barrel and the end of the nozzle. Several nozzles, which are the only part of the machine to wear out, are supplied with it and they can be readily made by any foundryman.

Semi-Automatic Ten-Spindle Drilling Machine

A machine which is said to be particularly adapted for drilling small holes, such as cotter pin holes in pins, bolts, screws, nuts and work of a similar nature, has been brought out by the Langelier Mfg. Company, Providence, R. I. This machine has a continuous feed and can be built in different sizes for various classes of work, with any number of spindles up to ten, this being the size illustrated.

In the machine illustrated, the ten spindles have ten work holders or vises which rotate around a stationary cam. As the spindles rotate they feed outward and nine pieces are drilled simultaneously while the work is inserted at the tenth or loading position. While the drilling operation is proceeding in the other nine positions, one of the drills withdraws as it passes the loading position, and the corresponding vise opens automatically, thus enabling the operator, who can sit or stand as may be found desirable, to insert fresh pieces in the vises as they come around and are opened. The closing of the vises is either automatic or by foot power, at the will of the operator, whose only duty is to insert work in the vises, which can be made to hold different sizes and shapes of work. Either vertical or horizontal vises can be supplied, the style being determined by the class of work handled. When long pieces are to be drilled, the vises are made to hold the work in a vertical position, the piece extending upward, and any reasonable length can be operated upon. An automatic ejection device can be used to advantage on some classes of work, so that when the jaws automatically open, the work will be forced out.

The spindles are hardened and ground and run in phosphor-bronze bearings. The maximum feed is 1½ in. and the chucks will take drills up to a maximum diameter of ¼ in. The feed cam which operates the spindles can be readily removed and another of a different range substituted. For deep hole work, these cams are so formed as to withdraw the drills frequently, thus breaking and clearing the chips from the holes. The feed can be changed to suit the depth of the holes and the size of the drills. In the spindle drive, all gears have been dispensed with, thus giving a drive which, it is pointed out, is strong and noiseless and enables the machine to be run at as high a speed as is desired.



A New Semi-Automatic Ten-Spindle Drilling Machine with Continuous Feed, Designed Especially for the Drilling of Cotter Pin Holes in Bolts and Screws and Similar Work

Ample provision is made for lubricating the drills, the lubricant being forced between the vise jaw and the work. In this way the pieces being drilled are flooded at the point where the tool is cutting, thus giving high rates of feed and speed. The ten drilling heads are surrounded by a circular pan having an ample capacity for holding the drilled work and the chips. The oil passes off through a strainer into the base and is pumped back to the work by a circulating pump.

The capacity of the machine is round pieces, from ¼ to 1 in. in diameter. Two sets of vise jaws are provided, the first one handling work up to a maximum diameter of ⅝ in., while the other set accommodates the rest of the range. A drill guiding bushing to center the drill accurately is carried by the jaws, which can be changed very quickly, if desired. For accurately registering the work, a set of adjustable stops is provided.

A recent high production record was established by this machine in the manufacture of automobile chain pins. These pins, which are ½ in. in diameter, were drilled with a drill 0.121 in. in diameter, running at a speed of 2200 r.p.m., at the rate of 20 per min.

The Los Angeles Aqueduct

The Los Angeles Chamber of Commerce, Los Angeles, Cal., furnishes a description of the building of the Los Angeles aqueduct, which ranks among the world's great engineering achievements. The description is prepared by Henry Z. Osborne, former president of the organization. The aqueduct conveys water to the city of Los Angeles from the Owens River Valley of the Sierra Nevada Mountains, 250 miles away. Its capacity is 265,000,000 gal. per 24 hr.

The preliminary steps for this great work were taken in September, 1904, on the recommendation of William Mulholland, chief engineer of the Los Angeles water board, and under whose direction the project was carried to completion. Many obstacles were encountered, partly from advocates of rival projects and partly financial, and it was not until June 12, 1907, that the city by popular vote decided in favor of the proposition and of an issue of $23,000,000 bonds for the purpose of defraying the expenses. The building of the aqueduct compelled the construction of a railroad 144 miles long, as well as hundreds of miles of ordinary roads and trails to make all parts of the work accessible. The railroad was provided through a contract for transportation made with the Southern Pacific Company.

The elevation of the intake of the aqueduct is 3812 ft. above sea level. There are five reservoirs on the line, which consists of canals, covered conduits, tunnels and siphons. The siphons for crossing valleys are mainly constructed of steel, with a diameter of 7½ to 11 ft., built to stand a pressure of 350 lb. to the sq. in. There are 23 steel siphons with a total length of 12.06 miles. Some valleys are crossed by conduits of cement, supported by cement columns and abutments. The tunnels, having an aggregate length of 43 miles, were bored through mountains to shorten the length of the aqueduct.

At various points on the line power plants have been erected whence power is transmitted to the city of Los Angeles over high tension lines. A two days' celebration of the completion of the aqueduct will be held at Los Angeles November 5 and 6, 1913.

A hearing was held in Chicago last week before F. E. Esch, special examiner for the Interstate Commerce Commission, regarding the complaint made by shippers that the Great Northern, Canadian Pacific and other railroads operating between Duluth and Chicago were not warranted in raising the rate on scrap iron and steel from 8½c to 10½c per 100 lb.

Customs Decisions

Combing Machines

The Board of United States General Appraisers has denied free entry to combing machines imported by Richards, Atkinson & Haserick, Boston. Duty was assessed at the rate of 45 per cent. as "manufactures of metal." The machines, which were imported for the Lowell Textile School, were claimed free of duty as "scientific apparatus intended for the use of an educational institution." The testimony showed that the machines were entered in good faith, but no certificate of receipt by an official of the school appeared with the official papers as required by the Treasury regulations. Owing to this defect in the protest, the board was compelled to affirm the collector's assessment at full rates.

Milling Machines with Spare Parts

The Bosch Magneto Company, Springfield, Mass., has been partly sustained by the board in a controversy regarding the classification of milling machines imported with extra and spare parts, engraving machines, and lathes accompanied by special equipment. The importer objected to the surveyor's assessment separately of duty on the milling machines and tools or parts, the machines at 30 per cent. as "machine tools," and the tools or parts at 45 per cent. as "manufactures of metal." It was claimed that the merchandise is, in its entirety, covered by and dutiable under paragraph 197 only as "machine tools." As to these articles, the board held that it does not appear that the assessment of duty on the additional parts for reserve use, separately from the assessment of duty on the machines they accompanied, is unusual or contrary to law.

It was established that attachments similar to the reserve parts were on the machines at the time of their importation. Under these circumstances, the board held that the extra or reserve parts were not subject to classification with the machines as entireties. The engraving machines, and brass cuts described as alphabetical letters engraved on square sections of brass about 2 or 3 in. square, were held to have been properly assessed at separate rates, and not as entireties, as contended by the importer. The lathes entered by the protestants were fitted with special equipment. The testimony showed that such accessories are necessary for the equipment of the lathes with which they were imported. The board therefore decided that the accessories were rightly classifiable with the machine tools they accompany as entireties, the surveyor being reversed.

Hay Loaders

The customs officials at Niagara Falls, N. Y., were reversed by the board in a case dealing with the classification of hay loaders. They were taxed at 45 per cent. as "manufactures of metal," and were claimed to be dutiable at 15 per cent. under the provision for "harvesters." The decision of the board, written by Judge Fischer, sustained the protest, pointing out that in a recent decision Stewart sheaf loaders were held to be harvesters within the meaning of the tariff, and that the same rule should apply to the hay loaders now in controversy.

Punches and Shears

The Wiener Machinery Company, Galveston, was successful in a protest affecting the classification of machines made wholly of metal, operated or driven by power, and used for punching and shearing metal plates. Duty was collected under paragraph 199, as "manufactures of metal," at 45 per cent. whereas the importer claimed 30 per cent. duty under paragraph 197, providing for "machine tools." The decision held that the machines are fitted with interchangeable tools, and are power-driven workshop appliances of the kind generally recognized as machine tools.

Turret Lathes with Parts

The board took favorable action on a protest by Eugene Dietzgen & Co., New York. The merchandise in controversy consisted of turret lathes accompanied by tools, parts or other accessories. The collector assessed the lathes at 30 per cent. under paragraph 197 as "machine tools," while the tools, parts or accessories were taxed 45 per cent. under paragraph 199, as "manufactures of metal." The importers claimed that the collector erred in not assessing the merchandise as entireties, at 30 per cent. as machine tools. The testimony adduced by the protestants was to the effect that the lathes would not be complete without all of the invoiced parts, and that such parts are necessary to equip the lathes, which could not be used without them. This being so, and as they are imported with the lathes for which they are made, the board ruled that the machine parts as invoiced were properly classifiable with the machine tools they accompany as entireties.

Various Cutting Machines

Adverse action was taken by the board on protests by Knauth, Nachod & Kuhne, New York, regarding the classification of various machines designed for the cutting of dough, biscuits, paper, textiles and glass tubing. Other machines included in the importations are used in color work on decalcomania sheets. All of the machines were returned for duty at the rate of 45 per cent. as "manufactures of metal" under paragraph 199. The importers contended that the machine should be deemed "machine tools" within the meaning of paragraph 197. The board held that the machines, whether operated by hand power or otherwise, were not machine tools within the recognized limitations of that term as used in the present law.

Hack Saw Frames

It has been decided by the board that hack saw frames, imported without saws, are not classifiable as "hack, hand, and all other saws not specially provided for" under paragraph 168. Charles H. Langley, Boston, the importer, made the claim, asking for duty at the rate of 25 per cent. ad valorem. The frames were assessed at 45 per cent. under paragraph 199. The board upheld the assessment on the ground that the frames are not saws.

Great Power Development in California

The Secretary of Agriculture has issued a permit to the Pacific Light & Power Corporation, Los Angeles, Cal., to construct a series of power plants in the Sierra national forest. The company plans to build four power houses, two reservoirs, and 25 miles of cement-lined tunnels. On account of the magnitude of the construction work and the amount of power to be disposed of, the permit provides for construction extending over a period of 12 years. Under a temporary permit the company has nearly completed the first step of this development, known as the Big Creek project, on which the work is being done by Stone & Webster, Boston. The ultimate development proposed is about 150,000 hp. The greater part of this power will be transmitted 240 miles into Los Angeles and vicinity. It is also expected that considerable quantities will be utilized in pumping water for irrigation in the upper San Joaquin Valley. The power will be transmitted over a double steel tower line strung with stranded aluminum cables and at a pressure of 150,000 volts, the highest yet attempted in commercial transmission.

This development of the Pacific Light & Power Corporation is one of several under way or projected upon national forest lands in California. Among these are the projects of the Great Western Power Company on the north fork of the Feather River, where a reservoir of 43 square miles is to be constructed and power plants with a capacity of about 350,000 hp. are to be built. The Southern California Edison Company is planning for the development of four plants on the Kern River. The Pacific Gas & Electric Company is constructing on the South Yuba one of the highest masonry dams in the world.

Three hundred molders employed by the Simmons Mfg. Company, Kenosha, Wis., walked out July 15, demanding a revised wage scale. The company was taken by surprise, having had no idea of a strike. It has always been the custom of this company to submit any differences to arbitration. A speedy settlement of the difficulty is expected.

The Radley Steel Construction Company, successor to John J. Radley & Co., Inc., announces that its new works, located at Vernon avenue, Pierce avenue and East River, Long Island City, N. Y., formerly occupied by Ravitch Brothers, is now in full operation. Its general offices are located at the same address.

Wire Automobile Wheels Not a Fad

A Manufacturer of Wire Wheels for Automobiles Gives His Views Regarding Their Advantages

BY W. F. EVANS*

The present-day demand for wire wheels in the manufacture of automobiles is simply another evidence of the intention of automobile engineers to make the automobile a creature of steel and other metal. Gradually the wood that was first found profusely in automobile construction has been displaced by metal—witness the elimination of wooden bodies and the substitution of metal bodies—until practically no wood remains in the modern automobile. The substitutions of metal for wood were brought about largely by the desire for reduction in weight in the first instance; and the elimination of joints and the enabling of better lines and more artistic appearance of the finished product in the second place. Obviously the use of metal in place of wood has also been attended by greater safety and strength.

Wire Wheels Make a Car Easier to Handle

This latest substitution of wire wheels for wooden wheels, which has taken such a strong hold on the American public, has probably more to commend it than any other metal-for-wood substitution which has heretofore been made. Besides being stronger and lighter than the wooden wheel, and decidedly more refined in appearance, and, therefore, more in harmony with the advanced ideas of car building of today, it also assures what is the all-determining point to be considered at this stage of the development of the industry, namely, a great reduction in tire cost—all this in conjunction with the fact that the wire wheel makes the automobile a much more comfortable vehicle and a very much easier one to handle.

The lightness of the wire wheel makes for easier steering, on account of the rebound when driving over the average road, as well as by reducing greatly the gyroscopic action present in the heavy rim wooden wheel. It is apparent even to the layman that reduction in the rebound due to weight is in itself a tire economy. The saving in weight is made almost entirely at the periphery of the wheel, which reduces the blow to the tire when coming in contact with ruts or other obstructions over 50 per cent. A simple illustration of this point can be made in this way: If a man swings a heavy hammer held by the handle over a certain radius, he will strike a far more effective blow than if he grasps the hammer by the head and executing the same swing strikes the object with the handle of the hammer.

Less Trouble with Tires

In the early days of the automobile industry, tire blow-outs were seldom heard of; in those days tires wore out. It was only after the adoption of the heavy demountable rims, which added tremendous weight to the periphery, that the blow-out became a matter of frequent occurrence. It has, therefore, been the experience of the automobile user that this convenience in mounting and demounting tires has been very dearly bought.

It should also be borne in mind that the wire wheel is a suspension wheel. In other words, it carries the weight equally distributed at from 66 to 70 different points of the rim in accordance with the number of spokes employed. On the other hand, the wooden wheel is a stiff, rigid construction with the weight being borne downward on one or two stiff, rigid spokes, as the case may be. The introduction of the wire wheel into the gear of a car means really an added set of springs or shock absorbers between the road shocks and the springs of the car.

The modern wire wheel practice provides for the carrying of an extra wire wheel with inflated tire. When a change of tire is necessary, there is only one nut to be removed, which is accomplished by the ordinary inexperienced driver in from two to three minutes; and the operation is accompanied with a good deal less physical exertion than with any of the demountable rim wood wheels suitable for ordinary pleasure car service.

Other Arguments in Favor

Another strong argument in favor of the wire wheel is heat radiation. Most car drivers have, no doubt, felt the tires after ordinary service in warm weather and have noticed a tremendous increase in temperature after very little mileage has been made. This is due to road contact in a small degree and to internal friction in a very large degree. The wooden felloe of the ordinary wheel, being a non-conductor of heat, acts as an insulator against radiation and gives this destructive heat no chance to escape. The wire wheel, on the other hand, affords perfect radiation on account of its metal to rubber contact. The difference in tire temperatures to the average observer is most apparent.

The tendency to increase weight in the better class of motor cars of today, while not affecting appreciably the radial load-carrying capacity of wooden wheels, has practically eliminated all safety factor against side thrust. Wire wheels offer a tremendous safety factor in side thrusts due to the skidding of the car against curbs or other obstructions, and, while they may be bent and damaged in such collision, they are absolutely non-collapsible and consequently serve as a great protection to life and limb.

*General manager of the McCue Company, Buffalo, N. Y.

The Rennerfelt Electric Furnace

A new type of electric furnace has been put in successful operation at the Hallstahammer Iron Works in Sweden. The results are so satisfactory that it has been decided to build a steel foundry equipped with two furnaces of 1000 and 200 kg. capacity respectively. It is known as the Rennerfelt electric furnace and is built on much the same lines as the Stassano. The chief difference between the two types is in the arc field, which in this new furnace is vertical, one of the three electrodes being fixed in a vertical position. The other two, which are in a horizontal position, can be moved in vertically in order to provide facilities for varying the hight of the arc according to the level of the charge. Magnesite bricks have been employed in the lining instead of silica, which melt at a lower temperature. The furnace is cylindrical, with flat ends which support the two electrode holders, the third coming through the top. It is placed on roller bearings and is constructed in halves rendering the insertion of brickwork easy. Some of the chief advantages claimed for this furnace are: 1. A high thermo-electric efficiency. 2. Any system of energy can be used, the number of periods being immaterial. 3. The arched roof with only one electrode is strong and durable and loss by radiation is small. 4. The form of the arcs and their position assist the reaction. 5. The arcs are independent of the charge, insuring smooth and quiet working.

Eight of these furnaces are at work or under construction. The furnace at Hallstahammer has refined 102 charges without any repairs except the ordinary care of the bottom. It has been worked for more than seven weeks at an average of 12 hours per day, being kept warm when not working. Thus far the consumption of electrodes has averaged about 2.5 kilos per ton of finished steel, and the average consumption of energy about 590 kw. hr. per ton of steel. This latter could be lessened by using larger furnaces.

The Federal Pressed Steel Company, which is building a large plant at Keefe avenue and North Pierce street, Milwaukee, Wis., is making preparations for the beginning of operations about August 15. With this in view, the corporation has increased its capital from $50,000 to $150,000 and made additions to its official and operative staffs. James G. Cowling, formerly general manager of the Pierce Motor Company, Racine, and with its absorption by the J. I. Case Threshing Machine Company, manager of the motor car department of the Case interests, has been elected vice-president and a director and will also have charge of the sales department. The company will employ 150 men at the start and will produce hydraulic pressed and seamless steel of various kinds. George F. Markham is president and Arthur W. Fairchild is secretary.

The David Ranken Jr. School of Mechanical Trades of St. Louis, Mo., Tuesday, July 15, graduated 40 pupils. This class brings the total number of graduates since the establishment of the school about three years ago to 107. The school is an endowed institution and charges only a nominal tuition fee for its educational instruction. All its work is along practical lines and all the instructors are master mechanics at the various trades which they teach.

Submerged Electric Apparatus Uninjured

Floods and other aqueous happenings have brought to light some interesting information regarding the dependability of electrical apparatus. The General Electric Company, Schenectady, N. Y., furnishes the following data regarding unusually severe tests successfully withstood by apparatus of its manufacture:

How General Electric Apparatus Endured Floods

The Gray Coal Company, Danville, Ill., has two 35 and two 25-hp. motors in its development on the Vermillion River, Illinois. One of the 35-hp. motors was completely submerged in March, 1912, owing to an ice jam which backed up the river water, and remained so for 92 days. It was then protected from the weather and left on the bank of the river till the early fall, when the service of another motor was required and it was tested out to determine its condition. The test showed it to be all right, much to the surprise and gratification of its owner, and so it was immediately put into service, operating until March 24, 1913, when it was again submerged during a flood and remained under water until April 7, when it again tested out all right. The other 35-hp. motor was submerged last January and remained under water for 10 days. It was then dried out and connected up and found to be in perfect condition. One of the 25-hp. motors was also submerged, yet when tested out after the waters had receded it was all right.

Some time ago a standard motor performed remarkable service when submerged. A 20-hp., three-phase, 220-volt induction motor geared to a mine pump at the bottom of a shaft in the mines of the Richmond Iron Works, Richmond Furnace, Mass., was submerged by surface water that flooded the shaft during a thaw. Although two feet below the surface of the water, the motor continued to operate perfectly and at the end of two hours had pumped itself clear of water. It was then shut down just long enough to clean the dirt and chips from the rotor and to put oil in the bearings, after which it was put into regular service again, pumping 20 hours a day. Its performance since shows that it was uninjured by its remarkable experience.

In the works of the Sweet & Doyle Foundry & Machine Company and the Twinvolute Pump & Mfg. Company, Green Island, N. Y., three motors and a switchboard were completely submerged during the floor in the latter part of last March. When the waters had subsided, the dirt was washed off and the motors bearings were cleaned and oiled. After an hour's run, with no load, to dry them out, the motors were put into service and apparently had suffered no injury.

Submerged Crocker-Wheeler Motors Uninjured

Two remarkable performances of Crocker-Wheeler motors were recently brought to light by a representative of the Crocker-Wheeler Company, Ampere, N. J., who was on a business trip through California.

A ranchman has a Crocker-Wheeler form Q induction motor which he purchased to use in driving a pump for irrigation purposes. One night the power went off and the no-voltage release disconnected the motor, stopping the action of the pump. The water backed up from the irrigation ditch into the pit where the motor and pump were installed until the set was submerged in 4 ft. of water. In the morning the ranchman, who had not noticed that the motor was flooded, turned on the current and started the set, which ran from 10 to 15 minutes under water. When he discovered, to his surprise, that the motor was submerged the machine was taken out, dried in an oven and immediately put into service again. It has since been continuously running without repair or extra attention.

A somewhat similar occurrence was reported by another purchaser of a Q motor for irrigation service. In this case the water backed up from the ditch into the pit while the set was running and submerged both the pump and the motor. The set, however, continued to run until the pump became so clogged with dirt that the fuses of the switch blew out. The farmer cleaned the pump and pit and started the set again without further precautions and it also has since been running satisfactorily.

Abolishing Pig-Iron Warrants Proposed

The Movement of Cleveland Furnace Owners —Merchants Raise the Monopoly Cry

(Special Correspondence.)

LONDON, ENGLAND, July 15.—The iron masters of the Cleveland district, never altogether pleased with the speculation which was carried on in their pig iron, and completely disgusted at the cornering tactics lately seen, causing the collapse of the controlling house, are now considering proposals which have been laid before them by Bolckow, Vaughan & Co., the largest makers, for doing away altogether with the warrant iron markets of Glasgow and London. The plan is to form an iron holding and distributing company, the shares of which are to be taken up by the furnace owners, which will entirely control the sale of the iron produced. The furnacemen say that they are determined to put a stop to the gambling in their product by speculators who have no connection with the iron trade, and whose operations have latterly prevented that expansion of business which producers had every reason to anticipate. The merchant trade is very seriously disturbed at the proposals and the fact that a committee has been appointed to work out details.

At a meeting of iron merchants in Glasgow this week, the feeling was that notwithstanding the importance of the warrant market as a medium for financing the output of the furnaces it would not be advisable to protest as an association against the furnacemen's plan and it was considered more in accordance with the fitness of things that the individual merchants and consumers should raise their own protests. At a Middlesbrough meeting the merchants decided to write a letter setting forth their views of the case and this has been done.

For many years the Cleveland iron market has been dominated by speculators, and in the view of producers the time has now come for this to be scotched, furnace owners holding that recent events have made it clearer than ever that control by outside speculation is incompatible with the progress of the industry upon a sound basis. At the same time it remains to be seen how the iron produced is to be financed. The warrant market provided a certain and sure outlet for makers, if at any time they were not able to dispose of their production to the trade. When times were poor, the maker need only sell in the warrant market and get his money when the day came round for delivery. He need not wait till a consumer came along, and thus the necessity for the producer to consider the financing of his output never existed. If the warrant store system is abolished, then some other arrangement will have to be devised and for this the times are not too auspicious from the financial point of view. The banks will advance money freely enough against warrants, which are readily negotiable documents, but they would not be so ready to advance on produce which they could not throw out at any moment, if the necessity arose. If the company which it is proposed to form is to undertake its own finance, then it would appear that a very large capital will be required if the producers are to be paid with the promptness with which their accounts have been met by merchants and others. And if this capital is to be supplied, some one will have to find interest on it, and this might entail an additional charge upon productive cost. The merchants hold that any distributing or holding company is altogether unnecessary and that the existing merchant firms are fully capable of handling the business. They resent the proposals, arguing that the Cleveland furnace owners practically intend to set up a control, which is contrary to the principles of fair trade and "opposed to the best traditions of English commerce" while being calculated to create a mononoly "on the lines of the much condemned American trusts." It is also contended that the proposed arrangement would tend to benefit the foreigner, and to lead to the boycotting of Cleveland iron wherever possible, in favor of other brands.

The movement has created a profound feeling of disquiet among the distributing trade of the country and future developments are awaited with anxiety. Trading in warrants on the Glasgow and London markets has naturally shrunk to very small proportions; at the same time there are indications of the holding of iron in the yards of makers, which ordinarily would go into public stores.

ESTABLISHED 1855

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The Future of the Iron Market

Men in the iron and steel industry are busily engaged in attempts to forecast the course of the market, and the most common fruit of such efforts is a conclusion that the present time furnishes a particularly poor viewpoint from which to descry the future. We do not concur. It seems rather that men are undertaking to pry much farther into the future than they ever did. It may be rejoined that they are entitled to see farther into the future than formerly, because the channels of production and consumption are smoother and more orderly arranged. Granting this, however, it remains the fact that the system is much more complicated, owing to the increased number of channels.

The favorite method of prognostication is to seek a parallel in history. Perhaps it is to the prevalence of this habit that the present confusion of thought may be attributed, since it proves particularly difficult to find in all history anything to which this present situation may be likened. If one take the tariff viewpoint, as so many do, then we observe that in the past twelvemonth we made 11 per cent. more pig iron than the greatest amount in any similar period, whereas in the twelvemonth preceding the downward tariff revision of the summer of 1894 we made 45 per cent. less pig iron than in the previous record twelvemonth. That is quite a difference.

If one compare merely the ups and downs in the iron industry itself—and if iron is the barometer of trade such a comparison ought to be of value in gauging the general course of trade—he finds that a parallelism which held fairly good from 1893 through 1910, duplicating with considerable fidelity the years from 1873 through 1890, has fallen down entirely since 1910. For the year 1911 one finds no counterpart in 1891, for 1911 was a decidedly bad year, while 1891 was not particularly bad. The year 1912 diverged in the opposite direction, being a decidedly good year, whereas 1892 was not a good year. Having regard to the tonnage of pig iron produced and its market value, 1892 was substantially no better than 1891. For this present year of 1913 we certainly can find no counterpart in 1893. We have just made 5 per cent. more pig iron than in any previous half year, and 18 per cent. more than in any half year prior to the second half of last year. In the first half of 1893 the production was 7 per cent. less than the record for a half year, and that record had been made eighteen months earlier, the lapse of which time should normally have resulted in a material increase. Thus there is no parallelism.

Those who delight in cycles and are disappointed that recent swings baffle an effort to depict a 20-year cycle should observe that starting with 1893 and 1907 respectively some common points can be found. The "soda water rise" of 1895 corresponds quite nicely with that of 1909; in fact, the parallelism was much commented on at the time. In the summer of 1897, just four years after the panic of June, 1893, we had the lowest prices in all history for pig iron and finished products; four years after the panic of October, 1907, we had, late in 1911, the lowest prices for many years in all iron and steel commodities. The great improvement of 1912 falls just a little early to fit with the boom of 1899; but, perhaps, we ought to be able to do things a trifle faster in these modern times. The quietness of the present may prove to be not unlike

that of 1900. The substitute we here suggest may not wear better than did the 20-year cycle, but it certainly looks better at the moment. Those who wish to use the suggested parallelism as a prophecy may do so at their own convenience. The memory of what occurred after 1900 should be fresh in every one's mind.

Railroad Earnings Increased

The most accurate method of comparing railroad earnings from period to period is to use the monthly statistics of the Interstate Commerce Commission, which reduce the aggregates to the average per mile of road operated, thus avoiding the misleading tendency of aggregates, which naturally increase as the mileage increases constantly. The monthly compilation of late has included only roads having gross revenues annually of $1,000,000 or more. Such roads have about 89 per cent. of the total mileage, but receive 96 per cent. of the total revenue. The latest commission report is for the month of April, and the composite showing per mile of road is as follows for ten-month periods, ending with April:

	Ten months ended April,		
Per mile of railroad:	1911.	1912.	1913.
Operating revenues	$10,503	$10,502	$11,495
Operating expenses	7,193	7,247	7,919
Net operating revenue	3,310	3,255	3,576
Operating income	2,911	2,818	3,119
Miles reporting	215,953	219,436	221,599

The operating income is the net operating revenue plus the net revenue from outside operations, less accrued taxes.

The operating revenue per mile of road is a fair gauge of the density of traffic, which is seen to have greatly increased in the past fiscal year from a uniform rate during the two preceding years. Statistics are not available to carry the comparison in the above form farther back than is done in the above table, since for the earlier years of the "uniform accounting system" put into practice, July 1, 1907, the returns are for all roads, instead of for those of $1,000,000 or more annual revenue. Such rough comparison as can be made, however, indicates that none of the earlier years would make as good a showing as the poorest in the above table.

The increase in the total operating revenues in the ten months, ended last April, is 9.5 per cent. The increase in operating expense is, on the average, somewhat less, whereby the net operating revenue shows an increase of 10 per cent. over the period a year earlier, and of 8 per cent. over the period two years earlier.

The question is one of interpreting these increases. To a manufacturer, an increase in the total amount of business done which is not accompanied by a larger percentage of increase in the net profits is not an entirely satisfactory increase. The cost of production per unit is expected to decrease with heavier operations. Although there are many commentators upon the railroad position who seem to take the ground that increased profits should be eliminated by reductions in rates, it should be observed that the railroads are already losers of such additional profit as a manufacturer expects, through their operating expenses increasing as rapidly as their gross business. The increase is due largely to increased wages, while over a period of years there is a very considerable increase in the cost of commodities used by the railroads.

If the railroads were able to-day to secure commodities and labor as cheaply as they did fifteen or eighteen years ago, they would now be in a spectacularly flourishing condition. If, on the other hand, there had been no increase in the density of traffic, but other conditions were as they stand, nearly all the railroads would be hopelessly bankrupt.

A large element in the issue between the railroads and the public hinges upon this item of the increase in the density of traffic; to whom should the profit go? It is this increase which has saved the railroads from ruination, but large expenditures are necessary to take care of the increase. Additional track must be laid, signalling apparatus improved, and rolling stock and terminal facilities increased. Some critics seem to hold that the railroads desire to meet such expenditures out of profits, and they are not mollified by the suggestion that instead of doing this the railroads desire to pay the profits in dividends and thus establish credit upon which to borrow. Sometimes the railroads have actually contended—as they did in the Western rate case three years ago—that increased density of traffic means increased cost per unit of traffic. At any rate so Commissioner Lane interpreted their testimony when he insisted that the situation they presented showed that some other solution would have to be found than that of advancing rates as they desired.

The discussion of the railroad problem has centered so much upon this question of the establishment or improvement of railroad credit that sight is lost of the fact that very large and important expenditures are involved in operating expenses which are deducted before the item is reached of operating income, upon which railroad credit depends. If one may judge by the severe criticism the railroads gave the uniform accounting system when the commission imposed it upon them six years ago, the charges to operation for maintenance are larger than necessary. If the books have not been juggled, the funds have been established and maintained, and if they are too large, then year by year, irrespective of whether the railroads have any paper profits left, they have been able to improve their properties, entirely with money forming no part of the book profits. As to freight cars, for instance, the railroads claimed six years ago that the maintenance funds would accumulate more rapidly than the cars would wear out. If so, the railroads should be able to make some increases in freight car equipment without securing additional capital.

But wherever the minds of men may from time to time be disposed to place the burden of operating and improving the railroads, whether upon the public which pays the rates or upon the security holders who receive interest and dividends, the fact remains that year by year the density of traffic is increasing and that therefore it is physically easier to maintain the service. Traffic per mile of road has been developing at a rapid rate and there is no suggestion that it will not continue to increase. This cannot but help year by year in the solution of the great problem. If all railroad managers are not yet able to reduce the cost of performing the service, measured in units of commodities and labor employed, in proportion as the volume of the service demanded per mile of railroad increases, then they will have to learn how to bring this about. It is not to be credited that there is no way to do so.

Esprit de Corps in Works Management

Some manufacturers have carried out with a good deal of success what has been termed the college idea. Briefly, it is the engendering of a live spirit of co-operation between the management and the men, and of loyalty to the institution of which they are parts, that has something of the same meaning as the unbending loyalty the college stamps upon its alumni.

Attempts to create this condition are sometimes failures, but seldom wholly so. More times they succeed. In many establishments the relations of all the executive and department heads become the making of a powerful unit. The midday meal which brings the head men together daily is a factor. A similar influence proceeds from the associations of foremen, with their regular meetings for lectures and discussions, in which the men higher up often participate—all leaving tangible results in better methods and increased production. The bringing together of men creates a community of interest in the work in which they are taking part. Petty departmental differences are minimized. Every one who is worth his salt becomes more closely attached to the organization and is more active in meeting the competition of other houses engaged in the same line of industry.

However, to carry out the idea to completion requires that the co-operation extend deeply into the corps of workers, and it is surprising to what extent painstaking and tactful attempts have succeeded. The shop excursion or picnic, abetted and joined in by the management; the shop baseball team fighting for a factory league championship and backed by the interest of the owners; the athletic grounds maintained for the men—these and similar institutions, carried forward year after year, have most beneficial effects. In one large works where foremen's meetings have been held for years, the innovation was recently introduced of inviting workmen to join in the gatherings, the serious side of which is supplemented by a social hour and informal luncheon.

Every one knows plants where men stick if they can, unless they graduate to places of greater responsibility and remuneration elsewhere, in which case they are proud forever afterward of the old place of employment. The great reason for this is the loyalty developed by wise and sympathetic management.

The Greatest Year for Foreign Trade

Figures of the foreign trade of the United States during the fiscal year ended June 30, 1913, by the Bureau of Foreign and Domestic Commerce show that for the first time our combined exports and imports exceeded four billion dollars. The total foreign commerce for the year was $4,278,383,070, compared with $3,857,587,343 in the prior year, an increase of $420,795,727, of which increase $159,356,226 was in imports and $261,439,501 was in exports. The total imports were $1,812,621,160, against $1,653,254,934 in the previous year, and total exports, $2,465,761,910, against $2,204,322,409. The excess of exports over imports was $653,140,750.

The month of June kept up the good showing made by its predecessors with exports of $163,282,677 and imports of $130,858,803, giving an excess of exports of $32,423,874.

A recent conference convened by the Russian Minister of Commerce and Industry has decided that any change in the import duty on pig iron is unnecessary at present. Complaint had been made by consumers that the domestic supply was inadequate and high priced and therefore the duty should be reduced.

Tariff Debate Opens in the Senate

WASHINGTON, D. C., July 22, 1913.—The formal debate on the Underwood-Simmons tariff bill began on Friday last, Senator Simmons, chairman of the Finance Committee, making the opening speech. The measure will now be kept continuously before the Senate, and it is the expectation that the debate will last about five weeks. Senator Simmons's report with regard to the metal schedule was in part as follows:

"The bill as amended by the Senate Committee made extensive changes in schedule C in addition to alterations already made by the House committee in this schedule. The principal alterations made consist in placing pig iron, iron kentledge, spiegeleisen, iron and steel scrap, ferromanganese, iron in blooms, loops, and slabs, steel ingots, blanks, and billets, cast-iron pipes, and antimony ore on the free list, and in materially reducing the rates upon many of the heavy products of iron and steel as a result of transferring the foregoing basic materials to the free list.

"All of the enumerated products thus transferred to the free list, with the exception of ferromanganese, are produced in large quantities here at a cost which does not exceed that in other countries. They are all articles of prime importance in the industries generally, and, owing to their heavy and bulky nature, the relatively high cost of transportation in itself constitutes an impediment to excessive importations. In addition to this, the industry is largely controlled by a few great corporations.

"Judged by all available tests, the American iron and steel industry is fully able to sustain itself without Government aid. It has unrivaled supplies of raw material well situated with reference to one another. It has the use of abundant capital and the best of business organization, as shown by the large profits earned and the large reinvestments made in the industry. It is able to export in competition with foreign countries, as is freely admitted by its chief officials and as is shown by the figures of the Government. Were the domestic demand not so extensive as it has been, exports might be increased, and the testimony of the officers of the United States Steel Corporation shows that the prices abroad are about as satisfactory as they are at home. The industry has the advantage of low costs and when estimated from a rigid accounting standpoint. For all these reasons it may be regarded as well fitted from every point of view in which to establish rates of duty upon a strictly revenue-producing basis.

"The House bill placed iron ore on the free list mainly because it was found that the domestic supply of iron ore was largely controlled by the United States Steel Corporation, and for the purpose of aiding the independent iron and steel manufacturers in their competition with this monopoly. For similar reasons the Committee on Finance thought that ferromanganese should also be placed upon the free list. The United States Steel Corporation largely controls the domestic ore out of which ferromanganese, which is a necessary material in the manufacture of steel, is produced. This corporation is the only producer of ferromanganese in this country, but produces it only for its own use and consumption. It was thought under these conditions just that the independent competitors of this monopoly should be permitted to import this high-priced alloy free of duty, and that with iron ore and ferromanganese on the free list domestic competition would be strengthened and the price of the finished products of iron and steel would be eventually lowered.

"Having placed pig iron and allied products upon the free list, your committee felt justified in reducing the House rates upon many of the products of these raw and semi-raw materials, such as beams, girders, joints [joists?], car trucks, anchors, tin plate, etc. For this reason, as well as because the House rates were thought not sufficiently low to be competitive, further reductions were made in some of the more highly organized products of this industry.

"The committee amendment as to automobiles provides for reclassification of that paragraph and reduces the rates on low-priced automobiles 33 per cent. and 66 per cent., respectively, from the House rate, according to the value of the automobiles. The duty is likewise reduced on motor cycles, rail wheels and tires, and a number of other products used heavily in the industries.

"The duty on aluminum is changed from an ad valorem to a specific rate and the House rate reduced about 1 cent

per pound. It was thought by your committee that the circumstances justified a further reduction than that made by the House, and that owing to the great variation in the price of this product and the close alliance between the domestic and the foreign manufacturers, justified the substitution of a specific for an ad valorem rate.

"Of the very few cases where the Senate committee has raised the rates on the items carried in the steel schedule, those of lead ores, zinc ores, and zinc may be mentioned. In the House bill the rate upon lead ore is fixed at one-half cent per pound, which is a reduction of 66⅔ per cent. from the rate of the Payne-Aldrich bill."

Amendments Offered by Senators

Senator Gallinger of New Hampshire has offered an amendment changing section 132, knives of all kinds with the exception of pocket knives, so that a specific duty will be collected instead of an ad valorem one.

Senator Burton of Ohio has introduced an amendment making ferromanganese dutiable at the rate of 8 per cent. Also an amendment making T rails weighing not more than 40 lb. to the yard dutiable at the rate of 12 per cent. ad valorem, and putting on the free list T rails weighing more than 40 lb. to the yard.

Senator Oliver of Pennsylvania has introduced an amendment removing from the free list barbed wire, etc., and also an amendment making ferromanganese dutiable at the rate of $2.50 per ton. Also an amendment providing that "strips of iron or steel narrower than 1¼ in. and lighter than 15 wire gauge, cut to length, painted, or unpainted, with or without buckles, for baling cotton or any other commodity, and to be used as baling ties only," shall be placed on the free list. The object of this amendment is to restrict to the free list bands for baling cotton.

Senator Hitchcock of Nebraska has introduced an amendment providing that whenever a corporation, joint-stock company, or association, having a capital stock of not less than $100,000,000, shall produce or control annually over one-quarter of the annual production in any line of manufacture or production in the United States, the rate of tax to be levied, assessed, and paid annually upon the entire net income arising or accruing from all sources during the previous calendar year shall be 5 per cent.; over one-third of the annual production, the rate of tax shall be 15 per cent.; and over one-half of the annual production, the rate of tax shall be 25 per cent.

Senator Cummins of Iowa has proposed an amendment providing that "if, with respect to any article or commodity upon which an import duty is laid under the provisions of this act, substantial, effective, and actual competition as to extent of production, price for sale, or manner of distribution has ceased, or shall in the future cease, to exist among domestic producers or sellers, or both, generally throughout the United States, then and so long as such conditions, or either of them, shall exist, all imports of such articles or commodities shall be admitted free of duty into all the ports of the United States."

Senator Cummins has introduced an amendment, the purpose of which is to prevent import differential freight rates.

W. L. C.

British Shipbuilding Statistics

For the half year ended June 30 the total number of vessels launched on the Clyde, Forth, Tay, and Dee was 175, of 371,350 tons gross, as compared with 198 vessels of 305,645 tons in the first six months of 1912. The Clyde six months' total consists of 127 vessels of 348,475 tons, and this is the largest recorded by over 12,000 tons. Previously the best figures for the period were those for 1906, when an aggregate Clyde output of 336,258 tons was recorded. The next best figures for the first half of any year are those of 1911, when vessels aggregating 310,460 tons were floated on the Clyde.

At present, says the London Times, from which the foregoing figures are taken, although there is still plenty of work in the yards, the prospects beyond the end of this year are not promising. There seems now to be no danger of a national strike on the question of wages, but there are several matters outstanding between employers and men, and the irregularity of the hours kept by the ironworkers is a source of continuous trouble.

Increase in British Foreign Trade in Iron and Steel

The reports for the first six months of 1913 show an increase in British iron and steel exports both as regards tonnage and value, in comparison with the same period in 1912. Including scrap the total of iron and steel sent abroad was 2,564,787 gross tons, as against 2,314,735 tons to July 1, 1912, or an increase of 250,000 tons. In values the increase is significant, the total for the first six months, excluding scrap, being returned at £27,932,700 as compared with £21,550,000 in the same period of 1912. If this rate is maintained the total for the year will approximate £55,865,000, establishing a record. Record figures have also been attained in exports of finished iron and steel, these being 1,958,000 tons for the half year. Some products, such as wire and tubes, have remained about stationary. In rails a maintenance of the present rate of increase will insure a total exportation for 1913 of about 500,000 tons, which has been exceeded only twice since the formation of the rail pool in 1904. Rail exports for the first half year of 1913 are 254,615 tons, as compared with 191,002 tons to July 1, 1912. The most notable increase is that for galvanized sheets, the exports for the first six months of this year, 378,628 tons, being practically equal to the total tonnage shipped in any one year up to 1904. The increase in the case of rails and sheets is due to a greater colonial demand. Exports of pig iron are the smallest since 1909, due to a falling off in demand from Japan, Canada, Italy and Germany.

The import figures for the first half of the year show an increase in tonnage but not in value. The imports of iron ore amounted to 4,022,000 tons, as against 2,916,000 tons for the same period in 1912 and 3,513,000 tons in 1911. In semi-finished steel and manufactured products the total imports were 1,110,700 tons, as compared with 888,000 tons and 901,000 tons in the first six months of 1912 and 1911 respectively. These are also record figures, being at the rate of 2,224,000 tons per year as against the previous high record of 1,999,000 tons in 1912.

The Proposed Wheeling Consolidation

Favorable progress is being made on the proposed consolidation of the La Belle Iron Works, Steubenville, Ohio, Wheeling Steel & Iron Company, Wheeling, W. Va., Whitaker-Glessner Company, also of Wheeling, Portsmouth Steel Company, Portsmouth, Ohio, and Wheeling Corrugating Company, Wheeling, the last two interests being controlled by the Whitaker-Glessner Company. As yet no definite plans have been made as to the amount of capital of the new company in case the project goes through, nor has anything been done in regard to selecting officers for the consolidated company. Arrangements have been made with Julian Kennedy, the well-known consulting engineer of Pittsburgh, to make an appraisement of all the plants to be included in the deal, including the works of the Wheeling Corrugating Company. H. C. Dalton, of Pickands, Mather & Co., Cleveland, Ohio, has been appointed to appraise the ore properties. A great amount of detail work remains to be done, and it is not believed that the merger can be consummated inside of 60 days.

The Inland Steel Company's Earnings

The report of the Inland Steel Company, Chicago, for the year ended June 30 will show gross profits approximating 25 percent of the present outstanding capital stock of $7,157,170. Depreciation, reserves and other charges the previous year totaled $345,806, leaving a dividend balance equivalent to 12.38 percent on the stock. Deductions for the year just completed will doubtless be heavier, but with net profits of about $1,800,000 indicated, as compared with $1,232,087 the previous year a very satisfactory increase in the dividend balance is anticipated. With several months of business now on the books and additional plate mill and open-hearth capacity completed and about to be put into service, the outlook is decidedly promising. The company has further enhanced its position as a self-contained proposition by the completion of a gas producer plant which is now supplying fuel for its various heating and melting furnaces. Good progress is also being made on the Koppers by-product coke ovens in course of construction.

The Iron and Metal Markets

Signs of Improvement

Further Buying of Implement Bars

Chicago Pig Iron Market Leads in Activity—Little Firmness Elsewhere

There are some evidences of improvement in demand as well as in sentiment, the latter being plainly attributable to the better feeling in New York financial districts. Larger buying in certain products is reported from Pittsburgh and at Chicago more store is set on what is developing for the later months of the year. The week thus has some features in common with the first half of June, when there were signs of a break in the dullness that had settled upon the market.

The tangible facts on the favorable side are the buying of 30,000 tons of bars by implement firms, the first car orders worth mentioning in several weeks, and an increase in the business closed by fabricating firms. Some good-sized bar business in agricultural machinery lines is pending and steel manufacturers are asking 1.40c. Pittsburgh for deliveries to July 1, 1914, which is the basis of existing contracts running to the end of this year.

The new car orders amount to about 1500, including 920 for the El Paso & Southwestern. The New York Central has also placed 1000 steel underframes. It is expected that the Southern Railway order for 28,000 tons of rails will be given out this week. The Memphis, Dallas & Gulf Railroad has bought 6000 tons and another southern road is inquiring for 5500 tons for delivery on the Gulf coast.

Thus far, plates, structural shapes and bars have held the contract prices that have existed for months, and earlier deliveries than heretofore can be had at these same levels, the easier conditions in plates being pronounced. Buyers argue that when their contracts are renewed on heavier materials the influences that for some time have brought concessions on lighter products will control. At the same time sellers are not pressing sales for forward delivery, and thus in a number of products the issue as to the basis of large new contracts is postponed for the present.

The buying of cotton ties for the season of 1913 began this week on the basis of 84 cents a bundle. Estimates of the season's requirements range from 2,400,000 to 3,000,000 bundles.

Two of the new vessels for the Mallory Steamship Line have been placed at Newport News. The plates will probably go to an eastern mill and the structural shapes to Pittsburgh.

While prices on new fabricating contracts are far from satisfactory, some revising evidently having been done on projects recently let after being long held up, the volume of work awarded has increased. It is estimated that 230,000 tons is now under consideration, much of which is expected to be let in the next 60 days.

The Chicago district leads in pig iron sales in the past fortnight, a very considerable part of the total there going at lower prices than the furnaces are now quoting. In that district nearly all important melters have provided for a large part of their requirements in the second half.

In other sections, while a good many sales have been quietly put through, there has been no broad buying movement as yet. Prices in the East and Central West are not yet on firm ground. At Pittsburgh 4000 tons of foundry iron, August and September delivery, was bought at $13.65 Valley furnace for No. 2.

A 3000-ton sale of Bessemer pig iron is reported at $16 at Valley furnace.

On an Illinois purchase of basic 3000 tons went to Southern furnaces in keen competition. For Southern No. 2 foundry iron $10.50 Birmingham now seems to be minimum. Sales of 20,000 tons of Southern iron are reported for shipment to Australia.

The more cheerful cable report of the British iron market is traceable largely to the slight turn for the better on the exchanges there. Semi-finished steel is firmer on the Continent, with larger buying, and in Great Britain activity in galvanized sheets is marked. Germany's remarkable trade in the past six months is seen in pig iron production of 9,567,000 tons, 1,000,000 tons more than in the first half of last year, and exceeding Great Britain's output for an entire year.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous.

	July 23, 1913.	July 16, 1913.	June 18, 1913.	July 24, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia.	$15.50	$15.50	$16.00	$15.75
Foundry No. 2, Valley furnace	*13.75*	13.85	14.00	13.50
Foundry No. 2, S'th'n, Cin'ti...	13.75	13.75	14.00	14.75
Foundry No. 2, Birmingham, Ala.	10.50	10.50	10.75	11.50
Foundry No. 2, furnace, Chicago*	14.75	14.75	15.50	15.00
Basic, delivered, eastern Pa....	15.00	15.00	15.75	15.50
Basic, Valley furnace	14.35	14.35	14.50	13.50
Bessemer, Pittsburgh	16.65	16.65	16.90	15.15
Malleable Bessemer, Chicago*..	**14.75**	14.50	15.50	14.50
Gray forge, Pittsburgh	*14.40*	14.65	14.65	13.90
Lake Superior charcoal, Chicago	15.75	15.75	16.75	16.25
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh....	26.50	26.50	26.50	21.50
Open hearth billets, Pittsburgh..	26.50	26.50	26.50	21.50
Open hearth sheet bars, Pgh..	27.50	27.50	27.00	22.00
Forging billets, Pittsburgh	34.00	34.00	34.00	28.00
Open hearth billets, Philadelphia	28.00	28.00	28.00	24.40
Wire rods, Pittsburgh	*28.00*	28.50	29.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	14.00	14.00	14.00	16.00
Iron rails, Philadelphia.....	17.50	17.50	17.50	16.50
Carwheels, Chicago	*12.75*	13.00	13.50	13.50
Carwheels, Philadelphia	12.00	12.00	13.00	14.00
Heavy steel scrap, Pittsburgh..	*12.25*	12.50	12.50	13.25
Heavy steel scrap, Chicago.....	10.50	10.50	10.75	11.50
Heavy steel scrap, Philadelphia.	11.25	11.25	11.50	13.50
Finished Iron and Steel, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.42½	1.42½	1.52½	1.32½
Iron bars, Pittsburgh	1.65	1.65	1.65	1.35
Iron bars, Chicago	1.50	1.50	1.50	1.35
Steel bars, Pittsburgh	1.40	1.40	1.40	1.25
Steel bars, New York	1.56	1.56	1.56	1.41
Tank plates, Pittsburgh	1.45	1.45	1.45	1.30
Tank plates, New York.....	1.61	1.61	1.61	1.46
Beams, Pittsburgh	1.45	1.45	1.45	1.30
Beams, New York	1.61	1.61	1.61	1.46
Angles, Pittsburgh	1.45	1.45	1.45	1.30
Angles, New York	1.61	1.61	1.61	1.46
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.25
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.30
Steel hoops, Pittsburgh	1.60	1.60	1.60	1.40
Sheets, Nails and Wire, Per Pound to Large Buyers:				
Sheets, black, No. 28, Pittsburgh	2.25	2.25	2.25	2.00
Wire nails, Pittsburgh	1.70	1.70	1.80	1.65
Cut nails, f.o.b. Eastern mills..	1.75	1.75	1.80	1.65
Cut nails, Pittsburgh	1.65	1.65	1.70	1.55
Fence wire, ann'l'd, 0 to 9, Pgh.	1.55	1.55	1.60	1.45
Barb wire, galvanized, Pittsburgh	2.20	2.20	2.20	1.95

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville, Per Net Ton at Oven:	July 23, 1913.	July 16, 1913.	June 18, 1913.	July 24, 1912.
Furnace coke, prompt shipment	$2.50	$2.50	$2.15	$2.20
Furnace coke, future delivery..	2.50	2.50	2.25	2.25
Foundry coke, prompt shipment	2.75	2.75	2.75	2.40
Foundry coke, future delivery.	3.00	3.00	3.00	2.40

Metals, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	14.50	14.50	15.50	17.62½
Electrolytic copper, New York.	14.37½	14.12½	14.87½	17.62½
Spelter, St. Louis	5.25	5.15	4.95	7.20
Spelter, New York.....	5.40	5.30	5.10	7.35
Lead, St. Louis	4.22½	4.20	4.20	4.60
Lead, New York	4.35	4.35	4.35	4.70
Tin, New York	42.00	40.00	44.75	43.75
Antimony, Hallett, New York..	7.75	7.75	8.15	7.87½
Tin plate, 100-lb. box, Pittsburgh	$3.60	$3.60	$3.60	$3.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.50c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 2.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. to 1.50c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $28 to $28.50. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.50 to $1.60; galvanized, $1.90 to $2. Galvanized barb wire, to jobbers, $2.10 to $2.20; painted, $1.70 to $1.80. Wire nails, to jobbers, $1.70 to $1.80.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.70	$1.75	$1.80	$1.85	$1.95	$2.05	$2.15	$2.25
Galvanized ..	2.15	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from May 27, 1913, and iron pipe (full weight), from June 2, 1913:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜.....	72	51½	⅛ and ¼	66	47
½	76	65½	⅜	65	46
¾ to 3	79	70½	½	69	56
			¾ to 2½	72	61

Lap Weld.

2	76	67½	1¼	56	45
2½ to 6.....	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.

1 to 3, butt.....	77	68½	1 to 1½, butt	70	59
2, lap	74	65½	2, butt	71	60
2½ to 4, lap.....	76	67½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap.....	68	59

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜.....	67	56½	⅜	63	52
½	72	65½	½	67	60
¾ to 1½.....	76	69½	¾ to 1½	71	62
2 to 3	77	70½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.

2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.

½	62	55½	½	57	49
¾ to 1½	65	58½	¾ to 1½	60	52
2 to 2½	67	60½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.

2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		*Standard Charcoal Iron.*	
1¼ and 2 in.....	60	1½ in.	44
2¼ in.	57	1¾ and 2 in.....	48
2½ and 2¾ in.....	63	2¼ in.....	44
3 and 3¼ in.....	67	2½ to 2¾ in.....	53
3½ to 4½ in.....	69	3 and 3¼ in.....	55
5 and 6 in.....	63	3½ to 4½ in.	58
7 to 13 in.....	60	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.70
Nos. 9 to 10	1.75
Nos. 11 and 12	1.80
Nos. 13 and 14	1.85
Nos. 15 and 16	1.95

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.90 to 2.00
No. 12	1.90 to 2.00
Nos. 13 and 14	1.95 to 2.05
Nos. 15 and 16	2.00 to 2.10
Nos. 17 to 21	2.05 to 2.15
Nos. 22 and 24	2.10 to 2.20
Nos. 25 and 26	2.15 to 2.25
No. 27	2.20 to 2.30
No. 28	2.25 to 2.35
No. 29	2.30 to 2.40
No. 30	2.40 to 2.90

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.30 to 2.40
No. 12	2.40 to 2.50
Nos. 13 and 14	2.40 to 2.50
Nos. 15 and 16	2.55 to 2.65
Nos. 17 to 21	2.70 to 2.80
Nos. 22 and 24	2.85 to 2.95
Nos. 25 and 26	3.00 to 3.10
No. 27	3.15 to 3.25
No. 28	3.30 to 3.40
No. 29	3.45 to 3.55
No. 30	3.60 to 3.70

Pittsburgh

PITTSBURGH, PA., July 23, 1913.

The chief feature of the local situation is the strong position maintained by the coke operators in their stand for $2.50 for furnace coke. A heavy tonnage has been sold at this price for July delivery. The makers of pig iron feel this condition keenly as some of them have sold a good deal of iron ahead based on getting coke at about $2, not believing that the coke operators would be able to maintain the $2.50 price for any considerable length of time. Local sentiment, however, is undoubtedly better, and it is claimed that in the past week more new business has been placed with the mills in certain lines than in any one week for some months. There is a good deal of activity in structural shapes, while the new demand for lap-weld pipe is so heavy that it is beyond the capacity of the mills to supply promptly. These are the good features, but when it comes to other items, such as plates, sheets and the lighter lines of finished material, the new demand is dull and specifications not satisfactory. All the mills still have more or less work ahead, some from four to six weeks and others three months or longer. With consumers indifferent about placing new contracts, and the mills well filled for some time ahead, the matter of prices on most lines of material is not being seriously considered; the situation is allowed to go along and largely take care of itself. When the mills are really in need of specifications, the question of what prices to make will be taken up, but not before. While a buying movement is looked for in early September or before, it will be a buying movement to meet actual needs, rather than one in which consumers will anticipate requirements.

Pig Iron.—The Standard Sanitary Mfg. Company has bought 3500 tons of No. 2 foundry and 500 tons each of No. 3 and forge iron for shipment to its works on the North Side, Pittsburgh, and New Brighton, Pa., the deliveries being August and September, with the option of taking in some of the iron in October. Prices said to have been paid are $13.65 at furnace for No. 2; $13.50 for No. 3, and $13.50 for forge. In the past week there have been transactions involving 18,000 to 20,000 tons of Bessemer iron and 6000 to 8000 tons of basic, but there were other deals in connection with these sales so that the prices paid for the Bessemer and basic iron are without significance. Small lots of malleable Bessemer iron have sold at $14, Valley furnace. The only stack that has blown out on account of the high price of coke is Ella furnace of Pickands, Mather & Co. at West Middlesex, Pa., but it is claimed that if the $2.50 price is held through August two or three of the Valley stacks may go out. We note a sale of 3000 tons of Bessemer iron for third quarter delivery at $16, Valley furnace, to be used in making ingot molds. We quote Bessemer iron, $15.75 to $16; basic, $14.35 to $14.50; malleable Bessemer, $14 to $14.25; No. 2 foundry, $13.75 to $13.85; gray forge, $13.50, all f.o.b. at Valley furnace, the freight rate for delivery in the Pittsburgh or Cleveland districts being 90c. a ton.

Billets and Sheet Bars.—The pressure from consumers for deliveries of billets and sheet bars is still strong, and while slightly better deliveries are being made, the mills have actual orders on their books that will take the greater part of the steel they can turn out in the form of billets and sheet bars over the remainder of this year. A contract involving 8000 to 10,000 tons of open-hearth sheet bars is reported to have been closed last week, deliveries running over remainder of the year at $27.50, makers' mill. We quote Bessemer and open-hearth billets for prompt delivery and also for shipment over remainder of the year at $27, and Bessemer and open-hearth sheet bars for the same delivery at $27.50, maker's mill, Pittsburgh or Youngstown. It is probable that two or three of the smaller steel mills that occasionally come in the market, and sell a few hundred tons for prompt delivery, might shade these prices about 50c. a ton. We quote forging billets at $34 and axle billets at $29, maker's mill.

Ferroalloys.—An inquiry is reported for 1500 tons of ferromanganese and another for about 1000 tons, both for last half delivery. The official price of 80 per cent. foreign ferromanganese is $58.50, Baltimore, but it is being offered at 50c. to $1 a ton under this figure. A carload is occasionally sold for prompt delivery around $58, seaboard. We quote 80 per cent. ferromanganese at $58 to $58.50, Baltimore, the rate for delivery in the Pittsburgh district being $2.60 a ton. Prices on ferrosilicon are firm and sales of two cars for prompt shipment are quoted at the full price of $75, delivered. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh.

Wire Rods.—There is little new demand and specifications against contracts are only fair, reflecting the quiet conditions existing in the wire trade. We quote Bessemer, open hearth and chain rods at $28 to $28.50, Pittsburgh.

Muck Bars.—Several important plants that make muck bar are still closed, the owners refusing to pay the flat rate of $7 a ton demanded by the Sons of Vulcan. As yet no conference has been arranged and these plants may be idle for some time to come. There is some inquiry for muck bar, which is scarce. We quote best grades, made from all pig iron, at $31 to $31.50, Pittsburgh.

Skelp.—There is a continued active demand for skelp, especially for wide sizes, and a local interest reports having made a sale of 5000 tons of wide sheared steel skelp for export. The pipe mills are taking in skelp promptly and makers are filled up for some time ahead. We quote: Grooved steel skelp, 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.70c. to 1.75c.; sheared iron skelp, 1.75c. to 1.80c.; all delivered to buyers' mills in the Pittsburgh district.

Steel Rails.—Small orders for standard sections, which aggregate a fair tonnage, are numerous and the rail mills of the Carnegie Steel Company are pretty well filled for the remainder of this year. The demand for light rails is active and the Carnegie Company received new orders and specifications last week for about 3500 tons. Splice bars are in active demand, the Seaboard Air Line being in the market for 35,000 to 40,000 sets. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—The president of one of the leading steel car companies states that he does not expect any important orders for steel cars to be placed until the money situation becomes considerably easier. The Denver & Salt Lake Railroad has placed 175 box cars with the Pullman Company, while the American Car & Foundry Company has taken 1000 steel underframes for the New York Central. The Southern Railway is in the market for 1000 to 1500 steel hopper cars. Leading plate mills report the new demand fair, with specifications from the steel car interests and other large consumers coming in quite freely. Some of the smaller plate mills have pretty well cleaned up existing orders and will now sell plates for delivery in two to three weeks. We quote ¼-in. and heavier plates for delivery in two to three weeks at 1.50c. to 1.60c., while for forward delivery 1.45c. is firmly held.

Structural Material.—The past week has been quite active. To correct reports printed about the material for the May Department Store in Cleveland, it can be stated that the original contract for about 8000 tons was placed with the Bethlehem Steel Company, by the Noelke-Richards Iron Works, Indianapolis, to fabricate the material. The latter concern got in financial trouble and gave up the work. A contract was then placed with the American Bridge Company for about 4000 tons of grillage material and foundation columns, and with the Cambria Steel Company, Johnstown, Pa., for 3000 tons of beams and other shapes. The McClintic-Marshall Construction Company has taken 1500 tons of material for export and about 2000 tons more is pending. This company has also taken a tower for the University of California, 500 tons, and bridge work for the Pittsburgh & Lake Erie Railroad, about 500 tons. The King Bridge Company, Cleveland, Ohio, has taken 1400 tons for the Art Museum of Cleveland, the material to be rolled by a local interest, which will also furnish 3400 tons of steel for new buildings for the Ford Motor Company, Detroit, for which the McClintic-Marshall Construction Company has the contract. The Fort Pitt Bridge Works has taken 250 tons for turntables and small bridges for the Seaboard Air Line. The McClintic-Marshall Construction Company has commenced the erection of the structural steel for the Kaufmann-Baer building in this city, which will take 7000 to 8000 tons. Bids have gone in on 1000 tons for new buildings for the Pennsylvania Rubber Company, Jeannette, Pa., and work in sight include 5000 to 6000 tons for the projected new Masonic Temple in this city. While all the fabricating shops are well

filled for some time ahead, it is said that new work is going at relatively low prices. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. Small lots from warehouse for prompt delivery are bringing from 1.60c. up, depending on the size of the order and the deliveries wanted.

Iron and Steel Bars.—The new demand for steel bars is a little more active, and specifications against contracts are coming in quite freely. The three leading makers of steel bars have their output practically sold up for the remainder of this year, and the market for forward delivery is firm at 1.40c., Pittsburgh. The new demand for bars for concrete reinforcing work continues heavy, and some mills are back eight to ten weeks. Iron bars have quieted down somewhat, but the mills have a good deal of work ahead. The makers of iron bars that formerly signed the scale of the Sons of Vulcan still refuse to pay the $7 a ton rate demanded by the organization and their puddling plants are idle. We quote steel bars for forward delivery at 1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.65c. to 1.70c. for delivery in six to eight weeks. The mills continue to charge $1 extra per ton for twisting ¾-in. and larger steel bars and $2 extra for ½ to ⅝ in.

Sheets.—Conditions in the sheet trade are unsatisfactory. The new demand is dull and only for small lots to cover actual needs, and specifications against contracts are light. Consumers seem apprehensive that prices will go lower and are holding off. As against this, the market on sheet bars is strong at $27.50 and it is claimed that sheet mills that have to pay this can hardly get out whole on present prices of black and galvanized sheets. Reports that some contracts for black and galvanized sheets placed some time ago have been readjusted are unqualifiedly denied. One leading interest is reported holding firm at 2.35c. for No. 28 black and 3.50c. for No. 28 galvanized. Blue annealed and electrical sheets are moving freely and prices are firm. The supply of steel is better, and this week the American Sheet & Tin Plate Company is operating to 82 per cent. of its hot-sheet mill capacity. We quote No. 10 blue annealed sheets at 1.75c.; No. 28 Bessemer black sheets, 2.25c. to 2.35c.; No. 28 galvanized at 3.30c. to 3.40c., and Nos. 28 tin mill black plate 2.25c. to 2.30c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—On Monday last the 24 hot tin mills in the works of the Jones & Laughlin Steel Company at Aliquippa, Pa., were started after being down three weeks for inventory and repairs. Serious trouble has occurred at the Pope works of the Phillips Sheet & Tin Plate Company at Steubenville, Ohio, where a strike has been on since July 1; some non-union men have been severely injured by the strikers and a deputy sheriff has been perhaps fatally shot. The company states it is making steady progress in getting its 12 mills started and claims to have 9 mills in operation this week. Specifications against contracts for the tin plate have been coming in more freely the past week, and the American Sheet & Tin Plate Company has practically its entire output sold up for this year, with others in the same condition. The can makers have their specifications pretty well in and are now taking heavy quantities of tin plate. The meat and salmon packers are also specifying. Shipments to these consumers will be heavy for the next two or three months. Practically no new business is being placed. We quote 100 lb. cokes nominally at $3.60 and 100-lb. ternes $3.45 f.o.b. Pittsburgh.

Spikes.—Specifications from the railroads are light. Unless the new demand soon improves, some of the spike makers will be very short of work. We quote railroad spikes in base sizes, 5½x9/16 in., at $1.70 to $1.75, and small railroad and boat spikes in carload and larger lots at $1.80 to $1.85 per 100 lb., f.o.b. Pittsburgh.

Shafting.—The new demand is still confined to small lots to cover actual needs, and specifications are not heavy. We quote cold rolled shafting at 60 per cent. off in carload and larger lots and 55 per cent in small lots delivered in base territory. On desirable orders, 61 and 62 off are being done in some cases.

Hoops and Bands.—Trade is quiet, as most consumers are covered by contracts, on which specifications are only fair. We quote hoops at 1.60c., but on a very desirable order 1.50c. could be done. We quote bands at 1.40c., extras as per the steel bar card.

Cotton Ties.—The Carnegie Steel Company has opened its books for cotton-tie contracts and announces the price as 84c. a bundle, f.o.b. Pittsburgh. Considerable sales have already been made at this figure. It is stated that the Pittsburgh Steel Company and the Sharon Steel Hoop Company will not make any cotton ties this year.

Bolts and Rivets.—The new demand continues quiet, being mostly for small lots, consumers not being inclined to buy ahead. Specifications against contracts are only fair and there is no trouble in getting prompt deliveries on either bolts or rivets. We quote button-head structural rivets at $2 and cone-head boiler rivets at $2.10 in large lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on bolts, which are not firmly held, are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70 and 2½% off
Small machine bolts, cut threads	75 and 10% off
Small machine bolts, rolled threads	75, 10 and 5% off
Large machine bolts	70 and 7½% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.F.C. and R. square nuts, tapped and blank	$5.70 off list
Hexagon nuts, ⅝ and larger	$6.60 off list
Hexagon nuts smaller than 9/16	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts, ⅝ and larger	85% off
Semi-finished hex. nuts smaller than 9/16	85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off
Standard cap screws	75, 10, 10 and 7½% off
Standard set screws	75, 10, 10 and 7½% off

Wire Products.—Reports current that the leading interest had made a reduction on wire nails from $1.80 to $1.70 and on plain annealed wire from $1.60 to $1.50 have proved to be untrue. Conditions in the wire trade are very quiet, and jobbers and consumers are buying only such quantities of nails and wire as are needed to meet current wants. The price of wire nails by the leading interest remains at $1.89 and annealed wire $1.60, but wire nails are offered by others at $1.70 and annealed wire can be had at $1.50 to $1.55. Prices on wire are slightly firmer than on nails. We quote cut nails at $1.65; galvanized barb wire, $2.10 to $2.20 per 100 lb. and painted $1.70 to $1.80 f.o.b. Pittsburgh, usual terms, freight added to point of delivery. Jobbers charge the usual advances over these prices for small lots from store.

Merchant Steel.—The new demand has settled down to small lots to cover current needs, but specifications against contracts are still coming in at a fair rate. One leading maker states it has actual orders that will take its entire output up to October 1. Prices are weak and in some cases are being shaded. We quote: Iron finished tire, 1½ x ½ in. and larger, 1.40c., base; under 1½ x ½ in., 1.55c.; planished tire, 1.60c.; channel tire, ¾ to ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth, finish, 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Standard Pipe.—Lap-weld pipe is in more active demand than any other item on the whole line of finished iron and steel and is heavier than the mills can furnish and make the deliveries wanted. A Youngstown mill is reported to have received an order for 160 miles of 8, 10 and 12 in. pipe for natural gas lines in the West, and an active inquiry is in the market for 50 miles of 4-in. pipe for delivery in Wyoming. The new demand for oil-country goods is heavy and the market is very firm. A scarcity in supply of iron pipe may develop before long, as two or three important puddling plants are shut down, and iron skelp is getting scarce. Discounts on iron and steel pipe are being well maintained.

Boiler Tubes.—On locomotive tubes the leading makers are filled for practically the entire year, and consumers are specifying freely. The demand for seamless tubing is also heavy and makers are sold up for 10 to 12 weeks. Discounts are being firmly held.

Coke.—At a conference of a number of the leading coke makers of the Connellsville region held in Pittsburgh on Tuesday it was decided to maintain the price

of standard furnace coke for July and August shipment at $2.50. The coke makers seem to have the situation well in hand. It is stated that furnace coke for spot delivery is scarce and has sold as high as $2.60 at oven. Sales in the past week are given as 30,000 to 40,000 tons or more, all at the full price of $2.50 or higher. Labor conditions are still bad, all the important coke works suffering from lack of men. The Connellsville Courier gives the output of coke in the upper and lower Connellsville region for the week ending July 12 as 390,470 net tons, an increase over the previous week of about 57,000 tons. We quote standard makes of furnace coke for July and August shipment at $2.50 per net ton at oven, but some grades of coke not as high in quality can be obtained at $2.25 or less. Standard makes of 72-hr. foundry coke are firm at $2.75 to $2.85 for prompt delivery and about $3 on contracts for last half of the year.

Old Material.—The market on scrap has improved to the extent that some consumers who are in need of material are making offers to the dealers, but so far the latter are declining to accept, believing that prices will be better before long. One dealer was offered $12.75 for a round lot of selected heavy steel scrap, but turned the offer down, holding for $13. It is believed that considerable sales of scrap will be made in the near future, as deals are on involving much tonnage. We note sales of 700 to 800 tons of selected heavy steel scrap at a price slightly above $13, delivered at consumers' mills. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pitt.burgh delivery	$13.00 to $13.50
Ordinary steel scrap	12.25 to 12.50
†Compressed side and end sheet scrap	10.50
No. 1 foundry cast	12.75 to 13.00
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.50 to 8.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to 14.75
No. 1 railroad malleable stock	11.50 to 11.75
Grate bars	8.25 to 8.50
Low phosphorus melting stock	16.00 to 16.25
Iron car axles	24.50 to 25.00
Steel car axles	17.50 to 17.75
Locomotive axles, steel	21.00 to 21.50
Locomotive axles, iron	25.50 to 26.00
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	7.50 to 7.75
Old carwheels	13.75 to 14.00
*Machine shop turnings	6.50 to 6.75
*Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	14.00 to 14.25
Old iron rails	14.50 to 14.75
No. 1 railroad wrought scrap	13.75 to 14.00
Heavy steel axle turnings	9.00 to 9.25
Stove plate	8.25 to 8.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Chicago

CHICAGO, ILL., July 23, 1913.—(*By Telegraph.*)

Occasional evidences of the preparations being made by the railroads for their extension work in the next fiscal year and also of general projects the undertaking of which is imminent lend considerable encouragement, despite the present dullness and the obvious unwillingness of most buyers to commit themselves to new purchases. The conservatism of the banks continues to have a strong influence upon sentiment. On the other hand there is very substantial testimony that no cancellations are appearing, and the mills are being urged to ship orders on their books continuously, indicating that consumption of iron and steel products holds up well. Contracting for steel bars by the implement interests is not yet entirely out of the way, although the time is fast approaching when the first specifications to cover fall manufacturing operations must be placed. These interests have also been buying bolts, and in the present week probably the largest purchaser of that product in the market will cover for about 40,000,000 bolts. Fabricators report a very satisfactory business offering, although made up almost entirely of small jobs. Local pig-iron producers were very active in the past week in closing pending business, and the indications are that outstanding inquiries have been largely converted into sales. Pig-iron prices are firmer to the extent of perhaps 25c. a ton. In the scrap market consumers' buying prices show practically no change from the quotations of a week ago, but the covering of short sales by dealers gave an appearance of activity to the local market and strengthened the opinion that for the present the period of lowest prices has been passed.

Pig Iron.—Sales the past week in this market, individually and collectively, were for large tonnages. The number of buyers who have not yet bought most of the iron they will use in the last half is comparatively small. The general disposition seems to have been to buy freely and as far into the future as possible. To what extent this liberal contracting is based on actual work in sight is an open question. There are indications that a proper conservatism may have been overbalanced by the attractively low level of prices. The bargain character of the quotations prevailing for a large share of the business placed is now more clearly established by the practical discontinuance of prices equivalent to $14.50 at Chicago furnace for either malleable or basic iron. The closing of attractive tonnages last week on the basis of $14.75 f.o.b. furnace and higher presents substantial evidence of an advance of about 25c. a ton. Foundry iron is not likely to be available at less than $15 at local furnaces. Southern iron sales, which have been backward, were somewhat more active last week. A considerable portion of the foundry iron yet to be purchased will probably be placed in the South, as was 3000 tons of basic for a southern Illinois steel company last week. For shipment in July and August the Southern price continues at $10.50, Birmingham, but for the last four months some producers are asking $10.75 and for the last three months $11. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$15.75 to $16.75
Northern coke foundry, No. 1	15.25 to 15.75
Northern coke foundry, No. 2	14.75 to 15.25
Northern coke foundry, No. 3	14.25 to 14.75
Southern coke, No. 1 foundry and No. 1 soft	14.85 to 15.35
Southern coke, No. 2 foundry and No. 2 soft	14.35 to 14.85
Southern coke, No. 3	13.85 to 14.35
Southern coke, No. 4	13.35 to 13.85
Southern gray forge	13.35 to 13.85
Southern mottled	13.35 to 13.85
Malleable Bessemer	14.75 to 15.25
Standard Bessemer	18.40
Basic	14.75 to 15.25
Jackson Co. and Kentucky silvery, 6 per cent.	20.40
Jackson Co. and Kentucky silvery, 8 per cent.	21.40
Jackson Co. and Kentucky silvery, 10 per cent.	22.40

(By Mail)

Rails and Track Supplies.—Activity on the part of the railroads in preparing their budgets of expenditures for 1914, together with a continued insistence upon immediate delivery on contracts, are regarded as favorable indications. The Chicago & Eastern Illinois has ordered 12,000 tons of rails from the Illinois Steel Company, and a fair tonnage is being obtained on small orders for immediate shipment. Local traction interests bought considerable track equipment during the week. We quote standard railroad spikes at 1.75c. to 1.80c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, $32 to $34, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Contracts for structural material continue scattered and of small tonnages. Deliveries continue to show improvement. The National Brake & Electric Company has let a contract to Worden-Allen Company for 564 tons to be used for foundry building at Milwaukee. The Wisconsin Bridge & Iron Company was awarded 164 tons by the Cleveland-Cliffs Iron Company for head frame and idler stands in the Athens mine at Negaunee, Mich. The American Car & Foundry Company, St. Louis, has awarded 112 tons to the American Bridge Company for 50 underframes for 1913 closed motor car bodies; the National Iron Company, Duluth, 218 tons for the Robert E. Denfield School building in that city; the American Bridge Company, 356 tons for the Bible Institute building, Los Angeles, Cal.; also 248 tons for the Twentieth avenue bridge, Seattle, Washington. The Milwaukee Bridge Company secured the contract from the Chicago, Milwaukee & St. Paul for 150 tons to be used in bridge work near Seabury, Washington. The Big Four Railroad has placed some additional tonnage for bridge work.

The demand for structural shapes out of store continues active and reflects the predominance of small jobs in progress. We quote for Chicago delivery from store 1.95c.

Plates.—Business is dragging and mills that were asking premiums in the period of activity are now campaigning for business. A few purchases of cars

have brightened the outlook somewhat for car builders. The El Paso & Southwestern has placed orders with the American Locomotive Company for five mikado locomotives and has also purchased 920 cars. The Chicago Junction Railway has placed five switching locomotives with the American Locomotive Company. The Southern Railway has increased its original order of 250 hopper cars given the Pressed Steel Car Company to 345 and has ordered 100 hopper cars from the Lenoir Car Works. The Union Railroad has purchased 300 gondolas from the same company. The Denver & Salt Lake has purchased 175 box cars from the Pullman Company, while the American Car & Foundry Company is reported as having secured the order for 1000 steel underframes from the New York Central. For Chicago we quote for delivery from mill 1.63c.

The buying of plates from jobbers is light and scattering, the reduction in store prices of $2 a ton having but little apparent effect. We quote for Chicago delivery from store 1.95c.

Bars.—The new demand for steel bars is confined almost entirely to the implement trade. The larger number of these interests have already contracted and now are preparing to specify for their fall requirements. Efforts on the part of those who have not contracted to obtain concessions from the price of 1.40c. have been unfruitful. The past week brought out considerable tonnage in iron bars and all of the mills report being urged to hasten shipments. The order for 700 tons of reinforcing bars for the new elevators being built for the Michigan Central Railroad is reported let to one of the local mills. We quote for mill shipment as follows: Bar iron, 1.50c. to 1.55c.; soft steel bars, 1.58c.; hard steel bars, 1.60c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

Reinforcing bars for building purposes are a leading item in shipments of steel bars from jobbers' stocks, accompanied by a fair demand for standard bars, particularly in the larger sizes. For delivery from store, we quote soft steel bars, 1.85c.; bar iron, 1.85c.; reinforcing bars, 1.85c. base, with 5c. extra for twisting in sizes ¼ in. and over, and usual card extras for smaller sizes; shafting 53 per cent. off.

Sheets.—Current buying of sheets is largely attributable to jobbers, the replenishment of whose stocks is forcing them into the market. Their purchases, however, are of conservative amounts and there is no present tendency to contract for extended deliveries. Most of the mills are aggressively seeking new business and price irregularities continue. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.48c. to 2.53c.; No. 28 galvanized, 3.43c. to 3.58c.; No. 10 blue annealed, 1.93c.

Nominally store prices are as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

Rivets and Bolts.—New bolt business in this territory has been confined, with the exception of miscellaneous general buying, to the annual contracting by the implement interests, most of which have bought. Particular interest attaches to the inquiry of one of the largest of the implement manufacturers, whose requirements, approximating between 35,000 000 and 40,000,000 bolts, will be covered this week. Despite the booking of the above business there remains sufficient capacity seeking new business to prolong the weakness in prices that has existed for some time. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 75-10-2½; cut thread, 75-7½; larger sizes, 70-7½; machine bolts up to ⅜ x 4 in., rolled thread, 75-10-7½; cut thread, 75-10-2½; large size, 70-10; coach screws, 80-12½; hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.08c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ¾ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, $5.30, and hexagon, $5.90 off per cwt.

Wire Products.—While no official change has been made in the price of wire products, business is still being taken by some interests at lower prices, nails being shaded 5c. to 10c. per keg and other products $1 to $2 per ton. Little new business is apparent and specifications against contracts are equally light. Our quotations, which are on business with jobbers, are nominal, sales being at $1 to $2 a ton less: Plain wire, No. 9 and coarser, base, $1.78; wire nails, $1.98; painted barb wire, $1.98; galvanized, $2.38; polished staples, $1.98; galvanized, $2.33, all Chicago.

Cast Iron Pipe.—No new contracts of pipe are reported for this week. Columbus, Ohio, will open bids July 22 on 1500 tons, and Bixley, Ohio, will receive bids on 800 tons until July 28. Canton, Ohio, is in the market for 500 tons. The award of 300 tons at Fergus Falls, Minn., has been held up pending the issuance of bonds, while the bids received some time ago at Springfield, Ohio, were all rejected and new specifications will be issued. We quote as follows per net ton, Chicago: Water pipe, 4-in., $28; 6 to 12-in., $26; 16-in. and up, $25, with $1 extra for gas pipe.

Old Materials.—The absorption of railroad offerings by dealers to cover short sales and the trading between dealers for the same purpose have given to the local market an activity which did not represent any particular increase in interest on the part of consumers. However, it gave strength to the belief that higher prices than have prevailed recently are now possible. Melters of scrap have not been buying with any greater freedom, but appear to be more willing to take in material at asking prices. The lack of interest by consumers is to a considerable extent offset by the unwillingness of the selling interests to move their holdings at concessions. Railroad offerings for the week include 1100 tons by the Chicago & Eastern Illinois, 200 tons by the Chicago & Alton and 1500 tons by the Chicago, Milwaukee & St. Paul. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton.	
Old iron rails	$14.00 to	$14.50
Old steel rails, rerolling	12.25 to	12.50
Old steel rails, less than 3 ft.	11.25 to	11.75
Relaying rails, standard section, subject to inspection		24.00
Old carwheels	12.75 to	13.25
Heavy melting steel scrap	10.50 to	10.75
Frogs, switches and guards, cut apart	10.50 to	10.75
Shoveling steel	10.00 to	10.25
Steel axle turnings	7.25 to	7.75

	Per Net Ton.	
Iron angles and splice bars	$13.25 to	$13.75
Iron arch bars and transoms	13.50 to	14.00
Steel angle bars	10.00 to	10.25
Iron car axles	19.25 to	19.75
Steel car axles	16.50 to	17.00
No. 1 railroad wrought	10.50 to	10.75
No. 2 railroad wrought	9.75 to	10.00
Cut forge	9.75 to	10.00
Steel knuckles and couplers	10.00 to	10.25
Steel springs	10.50 to	11.00
Locomotive tires, smooth	11.50 to	12.00
Machine shop turnings	4.75 to	5.25
Cast and mixed borings	4.75 to	5.25
No. 1 busheling	8.75 to	9.25
No. 2 busheling	6.50 to	7.00
No. 1 boilers, cut to sheets and rings	7.25 to	7.75
Boiler punchings	11.75 to	12.25
No. 1 cast scrap	10.75 to	11.00
Stove plate and light cast scrap	9.25 to	9.75
Railroad malleable	10.50 to	11.00
Agricultural malleable	9.25 to	9.75
Pipes and flues	7.25 to	7.75

Philadelphia

PHILADELPHIA, PA., July 22, 1913.

A sentimental feeling prevails that prices of pig iron have about reached bottom. Concessions are less freely obtainable, makers contending that they have reached a point where further reductions would net a sharp loss. Prices of crude products, particularly coke, show no disposition to recede and production costs tend higher rather than lower. Current pig-iron sales have been fairly good. The volume of business coming to finishing mills is irregular; in some branches new business continues at capacity rate, while on the other hand some mills are receiving less than 50 per cent. of capacity. Fall buying is expected to make up for the deficiency in volume at this season. Prices are generally maintained, but the market lacks the test of important inquiry. Some new boat business is coming to Eastern shipyards, which are already comfortably fixed for some time ahead. Old material is quiet but the market is sentimentally better.

Iron Ore.—Business is practically at a standstill. Importations during the week were confined to a cargo of 2500 tons from Venezuela.

Pig Iron.—While few comparatively large inquiries are openly before the trade, there are strong indications that certain of the more important consumers are making quiet inquiries for moderate lots and some transactions are believed to have been put through. Small lot buying is heavier, and consumers have more difficulty in obtaining price concessions. Where some weeks ago the booking of orders was sellers' first consideration, even though price concessions were neces-

sary, some producers are now turning business away, rather than make further reductions. In instances readjustments have been made bringing prices in line with ruling quotations. This is particularly the case in Virginia irons, which, delivered in this district, have been held at figures considerably above those named for eastern Pennsylvania irons. In the higher grades of foundry irons, general inquiry has been confined to small lots, and business has been moving, for reasonably early delivery, at prices ranging from $15.50 to $16 for standard brands of No. 2 X foundry, with No. 2 plain at $15.25 to $15.50. Southern foundry iron is not a very important factor in small transactions, although a strong competitor when any tonnage is involved. Virginia foundry, which has been held for some time at $13.50, furnace basis, for No. 2 X, is now available at prices ranging from $13 to $13.50 at furnace. At the inside quotations, prices range from $15.80 to $16 delivered in buyers' yards in this vicinity, representing about the usual spread between eastern Pennsylvania and Virginia irons. Some of the pending negotiations for pipe-making irons have been closed, one for 2000 tons of forge iron, placed by a Delaware River melter with an Eastern furnace, concluding its purchases against a recent inquiry for 4000 tons. Prices of low-grade iron are irregular, with $14.75 delivered at Delaware River points close to the top of the market. No definite large inquiries for off grade are out in this market, although a Virginia pipe maker is inquiring for several thousand tons for September shipment. Negotiations are pending in this market for some 2000 tons of charcoal iron. Rolling mill forge is more active, with sales of a 1000-ton lot and one of several thousand tons. This grade is now quotable at $14.75 delivered. Steel-making irons are quiet. There has been no further movement in basic, the inquiry by a central Pennsylvania consumer being still unclosed. Small sales of standard analysis low phosphorus iron have been made at $23.50 delivered, but Lebanon Valley low phosphorus is easier, small lots having been sold at $18.50 at furnace, representing a decline of 50c. a ton. The following quotations about represent the market for standard brands, delivered in buyers' yards, in this district, over the next few months:

Eastern Pennsylvania No. 2 X foundry	$15.50 to $16.00
Eastern Pennsylvania No. 2 plain	15.25 to 15.50
Virginia No. 2 X foundry	15.80 to 16.30
Virginia No. 2 plain	15.55 to 15.75
Gray forge	14.75 to 15.00
Basic	15.00 to 15.25
Standard low phosphorus	23.50

Ferroalloys.—There has been more inquiry for ferromanganese, both for prompt and forward delivery. An Eastern consumer is in the market for 200 tons for last half. Scattered sales of prompt carload lots have been made at concessions, but on forward business $58.50, seaboard, is firmly held on 80 per cent. ferromanganese. Importations during the week aggregate 585 tons. The demand for ferrosilicon continues quiet.

Billets.—Several fairly good sales, including one of 1500 and another of 500 tons of rolling billets, have been closed, but the general demand for small lots has been less active. Forging billets have been particularly quiet. Mills are operating at full capacity and are being urged for deliveries on orders. Prices show a somewhat wider range in that small lots command $28.90, delivered here, while on moderate lots $28 is being done, but on good-sized business the latter price could no doubt be shaded. Forging billets are firmly held at $34, minimum, Eastern mill, for ordinary analysis specifications.

Plates.—With some mills business has shown a moderate increase, while others note a further decline. Buying by the railroads has been better, and some heavier bridge plate specifications have come out. Some Eastern mills have entered further moderate contracts for third quarter at 1.65c., delivered in this district. Prospects of larger business in ship plates are good. The bulk of the buying is in miscellaneous lots for early delivery. Prices are being well maintained. Western plates, on which deliveries are steadily improving, are quoted at 1.60c. here, with the principal Eastern mills holding at 1.65c.

Structural Material.—Contracts for round lots, which have been under negotiation for some time, have been closing more freely. The leading interest has been taking the bulk of the large business, including 3000 tons of bridge work for the Baltimore & Ohio Railroad, 2200 tons for the American Iron & Steel Mfg. Company at Lebanon, 2400 tons for the Ritz-Carlton Hotel addition and 1000 tons for the Arcade Building addition. A contract for 5000 tons for a building in the South has been given to a local fabricator, the material for which, it is reported, has not been contracted for. Prices of plain material are maintained at 1.60c. here, but deliveries can be promptly obtained at this basis. Fabrication and erection prices are reported as being easy.

Sheets.—A satisfactory volume of new business has been coming to Eastern mills, order books again showing an improvement over the previous week. Quick deliveries are a factor, makers being constantly urged for prompt shipment. Mill operations are at full capacity. Prices are being fully maintained, Western No. 10 blue annealed sheets are being quoted at 1.90c. delivered here, with Eastern mills occasionally obtaining 1.95c. for spot shipment.

Bars.—A somewhat better tonnage has been coming out in iron bars, but the market lacks strength. Eastern mills are still seeking business, and ordinary iron bars are quoted at 1.42½c. delivered in this vicinity. A fair amount of specification against orders is coming to the mills. Steel bars have not been particularly active, but prices are maintained at 1.55c. delivered in this district.

Coke.—Producers maintain a firm attitude. Furnace coke for forward delivery is held at $2.50 at oven and consumers do not appear able to do better. Spot furnace coke ranges from $2.60 to $2.70. Moderate sales of foundry coke have been made at $3 to $3.25 at oven, and several contracts have been entered at $3.15. The following range of prices, per net ton, is named for deliveries in buyers' yards in this district:

Connellsville furnace coke	$4.05 to $4.50
Connellsville foundry coke	4.90 to 5.35
Mountain furnace coke	3.75 to 4.10
Mountain foundry coke	4.50 to 5.00

Old Material.—While the market has a stronger sentimental appearance, buying has been light. Heavy steel melting scrap is particularly quiet. More interest is being shown in rolling mill grades, but buying has not been active. Quotations are largely nominal; in the majority of grades not enough business is moving to establish a market. An approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to $1.35 per gross ton, is as follows:

No. 1 heavy melting steel	$11.25 to $11.50
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap (nominal)	14.50 to 15.00
Old steel axles (nominal)	17.50 to 18.00
Old iron axles (nominal)	25.00
Old iron rails	17.50 to 18.00
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	13.75 to 14.25
Wrought-iron pipe	11.00 to 11.50
No. 1 forge fire	9.50 to 10.00
No. 2 light iron (nominal)	6.00
No. 2 cut busheling (nominal)	8.00
Wrought turnings	7.75 to 8.00
Cast borings	7.75 to 8.00
Machinery cast	13.00
Grate bars, railroad	9.00 to 9.50
Stove plate	9.00 to 9.50
Railroad malleable (nominal)	11.50 to 12.00

Cleveland

CLEVELAND, OHIO, July 22, 1913.

Iron Ore.—Further delays have been caused in ore shipment by heavy rains that flooded the open pit mines and many boats had to wait for cargoes at the upper lake ports late in the week. The movement is again heavy and with favorable weather conditions in the last ten days of the month shippers predict that the expected 8,000,000-ton movement will be reached in July. Rapid unloading is being accomplished at some of the lower lake docks. During 26 hours, beginning early Saturday morning, the four 15-ton Hulett unloaders on the Lake Shore docks at Ashtabula handled 44,000 gross tons of ore. As four hours were taken for shifting and meals, the machines made a record of about 2000 tons per hour. On Tuesday morning the 199th boat for the season was being unloaded at the new Cleveland & Pittsburgh ore docks in Cleveland. We quote prices as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—Because of the $2.50 price for furnace coke the Ella furnace of Pickands, Mather & Co., of West Middlesex, Pa., is scheduled to go out of blast to-day. The demand in the northern Ohio territory is light. Most foundries not already under contract have enough iron to last them for the next few weeks. Cleveland selling agencies report a fair volume of business outside of this territory in foundry and malleable

grades. Sales for outside shipment include two lots of malleable, one of 4000 tons and the other of 1000 tons. The larger lot is understood to be a part of a 20,000-ton purchase. In addition to buying about 4000 tons of Northern foundry iron at slightly under $13.75 Valley furnace for its Pennsylvania plants the Standard Sanitary Mfg. Company has purchased 500 tons of No. 2 foundry for its Louisville plant at $10.50 Birmingham. Locally the price situation is unchanged. No. 2 foundry is quoted at $14.50, delivered Cleveland, and there is a possibility that this price might be shaded. The Southern iron market is quiet, but prices are firmer, quotations ranging from $10.50 to $11 Birmingham. Shipment continues heavy. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer	$16.65
Basic	15.25
Northern No. 2 foundry	$14.50 to 14.75
Southern No. 2 foundry	14.85
Gray forge	14.25
Jackson County silvery, 8 per cent. silicon	20.55

Coke.—The market is quiet, but prices on both grades are very firm. Several consumers of foundry coke have refused to place contracts at prevailing prices, believing that the market will go lower, and are buying spot coke. We quote standard grades foundry coke at $2.75 to $3.10 per net ton at oven for prompt shipment and the last half. On furnace grades the $2.50 price is being maintained.

Old Material.—The market continues very dull and weak. However, a somewhat better feeling has developed, this being apparently due to an expectation that the demand will improve shortly. One local consumer will not accept shipment of steel-making scrap until about August 1 and will probably come in the market for additional tonnage at about that time. Another consumer is taking heavy melting steel scrap at $11, but not a great deal is being offered at that price. Generally buying is limited to small lots that are offered at low prices. Yard dealers are accumulating some material but their stocks are not large. Railroad malleable and wrought scrap have declined 50c. a ton and some other grades are lower. While there is a difference of opinion as to whether prices will advance for some time, the feeling is quite general that they will go no lower. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.	
Old steel rails, rerolling	$13.00 to $13.50
Old iron rails	14.50 to 15.00
Steel car axles	17.00 to 17.50
Heavy melting steel	11.00 to 11.25
Old carwheels	13.00 to 13.25
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	10.00 to 10.50
Railroad malleable	10.00 to 11.25
Light bundled sheet scrap	9.00 to 9.50

Per Net Ton.	
Iron car axles	$20.00 to $21.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	4.25 to 4.50
Steel axle turnings	7.00 to 7.50
No. 1 busheling	9.50 to 9.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 cast	11.00 to 11.50
Stove plate	8.50 to 8.75
Bundled tin scrap	10.00 to 10.50

Finished Iron and Steel.—New business in most lines is rather light and specifications are coming out only in moderate volume. Some contracts for steel bars, plates and structural material for the remainder of the year are being placed. In structural lines the outlook is very promising. Considerable small work is being placed and some buildings requiring round tonnages are in prospect. The Cleveland Art Museum requiring 1200 tons has been taken by the King Bridge Company, Cleveland. The Republic Structural Iron Works Company, Cleveland, has taken 200 tons for rebuilding the Euclid avenue Pennsylvania station in Cleveland. Bids are in for 600 tons for an office building for the W. S. Tyler Company. There is considerable inquiry for steel bars for reinforcing purposes. Much of this business is going to the makers of hard steel because of the better deliveries offered. Eastern mills are selling plates and shapes for early delivery in this market at 1.45c., Pittsburgh, except for small lots, for which the ruling price is $1 a ton higher. There is some demand for forging billets which some Eastern mills are selling at $33 to $34, Pittsburgh. Mills are willing to make last half contracts at these prices. Rivet prices are well maintained at 2c. for structural rivets and 2.10c. for boiler rivets, and some contracts are being placed. Sheets are not in active demand. Prices are fairly steady at 2.25c. for No. 28 black and 3.30c. to 3.35c. for No. 28 galvanized. Light rails are in good demand for coal mine companies. Iron bars are very quiet, with prices unchanged at 1.50c. to 1.55c., Cleveland. The Union Rolling Mill Company, which has been shut down about a month, will resume operations July 28. Warehouse business is quiet with prices unchanged at 2c. for steel bars and 2.10c. for plates and structural material.

Cincinnati

CINCINNATI, OHIO, July 23, 1913—(*By Telegraph.*)

Pig Iron.—Soft spots have developed in Northern foundry iron prices, and $14, Ironton, can be done, with instances of where this same figure was inserted in contracts extending through the last half. However, both basic and malleable are firmer, and nothing less than $14.25 at furnace could probably be obtained, and it is stated that basic producers are holding out for $14.50. Southern foundry grades are stronger and $10.50, Birmingham basis, still represents the minimum in that market, with two or three producers not anxious to sell at that figure. The local molders' strike is still on, with neither side disposed to make concessions and, as a consequence, only four foundries are in operation here; hence the shipments to local foundry consumers have practically been stopped. The outside inquiry is also light, although a Michigan consumer has sent out a general request for prices on approximately 1200 tons of Southern foundry iron and almost a similar quantity of silvery. Several sales of Southern No. 2 foundry, ranging from carloads to 500 tons, have been made in the past few days to central Ohio and Indiana melters, all at $10.50, Birmingham, although as high as $11 for last half delivery has been obtained on a few small lots. Basic buyers are slow in coming into the market and in this territory there is also but a light demand for malleable. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$14.25 to $14.75
Southern coke, No. 2 foundry and 2 soft	13.75 to 14.25
Southern coke, No. 3 foundry	13.25 to 13.75
Southern, No. 4 foundry	12.75 to 13.25
Southern gray forge	12.25 to 12.75
Ohio silvery, 8 per cent. silicon	18.70 to 19.20
Southern Ohio coke, No. 1	16.20 to 16.70
Southern Ohio coke, No. 2	15.20 to 15.70
Southern Ohio coke, No. 3	14.95 to 15.45
Southern Ohio malleable Bessemer	15.45 to 15.70
Basic, Northern	15.45 to 15.70
Lake Superior charcoal	18.75 to 19.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—Scattered orders for small tonnages of furnace coke have been placed, but buyers are reluctant to make contracts for a future supply. Prices are very firm. While $2.50 per net ton at oven represents the average quotation in all three producing districts, it is stated that as high as $2.60 has been paid for Connellsville 48-hr. Foundry grades are correspondingly as high, and $3 at oven now is the regular open price, with a number of interests holding out for 25c. a ton higher. The coke producers seem to be of the general opinion that production must be cut down at the same rate as the blast furnaces curtail their output. The demand for domestic coke is a little slack, but this is probably only a temporary condition.

Old Material.—The improvement noted in other scrap markets does not apply to this territory. Stocks on hand in yards are heavy, and the nearby rolling mills also have comfortable quantities. The demand from the local foundries is practically cut off on account of the molders' strike, which has not yet been settled, and it is probable that the local cast scrap market will continue dull for some time. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	$7.25 to $7.75
Old iron rails	12.25 to 12.75
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	11.25 to 11.75
Melting steel rails	9.50 to 10.00
Old carwheels	11.00 to 11.50

Per Net Ton.	
No. 1 railroad wrought	$9.25 to $9.75
Cast borings	4.75 to 5.25
Steel turnings	4.75 to 5.25
No. 1 cast scrap	9.00 to 9.50
Burnt scrap	6.50 to 7.00
Old iron axles	16.75 to 17.25
Locomotive tires (smooth inside)	10.25 to 10.75
Pipes and flues	6.00 to 6.25
Malleable and steel scrap	7.50 to 8.00
Railroad tank and sheet scrap	4.75 to 5.25

Finished Material.—In some lines a slight decrease is reported in new business, but local warehouses are not complaining. On the other hand, it requires from two to ten days to make deliveries on orders for a number of kinds of stock material, notably reinforcing concrete bars. The local rolling mill reports the sheet business in satisfactory shape, with enough specifications coming in to take care of its output, so that it is still from five to six weeks behind on orders. Small structural shapes and steel reinforcing concrete bars are reported to be in demand for rebuilding the smaller bridges washed away several months ago, and many bids are being opened for this class of material by different municipalities and county authorities. Local warehouse prices on steel bars range from 1.95c. to 2c., and structural shapes from 2.05c. to 2.10c. Blue annealed sheets are sold from warehouse stocks around 2.40c.

Birmingham

BIRMINGHAM, ALA., July 21, 1913.

Pig Iron.—From all that can be ascertained the Alabama iron market has become firmer on a minimum of $10.50 for business in competitive territory and $11 for Southern delivery. The volume of business at $11 is reported as greater than that at $10.50, in spite of the open announcement of the latter price for the remainder of the year by one large operator, whose example, however, does not appear to have been followed. The leading interest is holding to $11, and the majority of others are endeavoring to do so. There was no great accumulation of iron in the past 30 days, but there are still 200,000 tons in the yards. The shipments to the foundries are on the increase and are expected to be from now on, with indications of a much heavier Southern consumption this autumn and winter. Operations at consuming plants have been uninterrupted and in most cases are on the increase. A sale of 1000 tons of No. 2 was made for prompt delivery at $11.50. While this iron has special qualities, it is not sold on the analysis basis. A sale of 3000 tons was made for delivery in Southern territory over the remainder of the year at $11. The interest quoting $10.50 has reaffirmed that price, but does not profess to have made any large deals. Carloads and lots from 200 to 500 tons were sold during the week at from $10.50 to $11, the better proportion of the business being around the higher level. Generally speaking, furnace interests appear to be more confident than for some time, and all report good inquiry. We continue to quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$11.00 to $11.50
No. 2 foundry and soft	10.50 to 11.00
No. 3 foundry	10.00 to 10.50
No. 4 foundry	9.75 to 10.25
Gray forge	9.50 to 10.00
Charcoal	24.00 to 25.00

Old Material.—The old material market is a hand-to-mouth proposition. Dealers are not adding to stocks, and prices actually obtained are reported as below our quotations. The lack of demand renders change of quotations meaningless, because as soon as the demand picks up the quotations will stand. Cast and heavy machinery melting scrap are both understood to have sold at low prices. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles (light)	$15.00 to $15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	10.50 to 11.00
Standard carwheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

Cast-Iron Pipe.—While large orders are not reported, makers of water pipe express a more buoyant feeling than for some time past. Many contracts which have been held up on account of the bond market, they believe, will be awarded in the next few weeks. Meanwhile, orders that have been received are such as to encourage the plants to maintain output. Accumulations are not sufficient to cause embarrassment. Soil pipe is reported as duller than usual. The new plant of the Gadsden Pipe & Foundry Company at Gadsden will manufacture only medium pipe for the export trade, Canada and Porto Rico being especially considered. We quote 4-in. $22 and 6-in. and over $20 per net ton. Prices might be shaded for large orders.

Coal and Coke.—Furnace coke is reported as 25c. per ton under former prices and easier to obtain desired supplies. Foundry coke is firm at the old figures and in demand. We quote, per net ton at oven, as follows: Furnace, $2.75; foundry, $3.50 to $4.

German Prices Still Receding

Steel Bars Particularly Weak—Pig-Iron Production at a Heavier Rate

BERLIN, July 11, 1913.

The price of bars has further declined and the rather active buying in the latter half of June has given way to pronounced quiet. The mills had been trying to hold the home price of basic bars up to 100 marks as minimum, and most of the sales up to the end of June were at prices ranging between 100 and 102 marks. This month offers as low as 98 marks are heard of, and even this price is further lowered by a discount of 1½ per cent. The Hoesch Company, Dortmund, one of the largest German producers of bars, is selling at 98 marks. In competition with Belgian works, the export price has further fallen. Offers at 91 marks f.o.b. Antwerp are being made by some of the western mills.

Bar Makers Continue Trying to Organize

The attention of the trade is still closely bent upon the prospects of organizing the bar manufacturers. Two committee meetings and a general meeting of all the interests are scheduled for next week. It appears now that the allotment demand of Thyssen for his Hagendingen mills will prove the chief obstacle. He is asking for 250,000 tons, which the other mills, it is said, regard as being so excessive that they will refuse even to discuss it. The Gewerkschaft Deutscher Kaiser, which is one of Thyssen's establishments, has just given out a statement. It appears that a committee of the Steel Works Union, at the time of the last renewal of that body, visited the Hagendingen works, in Lorraine, and estimated their capacity at 400,000 tons a year; and as it was impossible to give him anything like such an allotment in the Union he was encouraged by the committee to put in rolls for turning out the more finished goods. The establishment being then still in course of construction, it was possible to change the plans, and preparations were accordingly made for producing chiefly bars. Thyssen's demands will be adhered to firmly, it is believed, and as Gelsenkirchen and Burbach are also asking for large allotments the outlook is not reassuring for the movement.

Pig-Iron Production Increasing

The pig-iron market remains practically unchanged, but the rate of production has made a further gain. The production for June (30 days) reached 1,608,305 metric tons. This was about 33,300 tons less than for May (31 days), but the daily output was actually about 680 tons greater than in May. The total make for the first half year was 9,567,666 tons, which compares with 8,564,988 tons in the first half of last year.

A report on the state of business with iron foundries shows that the political unrest of the past nine months has caused an attitude of reserve on the part of buyers, but that the works have managed to keep fairly well employed. Consumers are disposed to bring pressure upon prices; but founders point out that the price of their raw material is as high as ever, and a reduction cannot be made in their finished products. In view of the fact that they are now paying higher prices for coal, as well as for wages, the founders are rather disposed to restrict production than to cut prices.

The Wrought Iron Association several days ago voted to make no change in prices for this quarter in view of the fact that pig iron and coal have not been reduced. A meeting of the western dealers' association will be held next week for the purpose of recommending to several branch organizations that they make reductions corresponding to the prices already adopted by a number of others.

June Shipments of Steel Syndicate

The shipments of the Steel Works Union in June amounted to 594,000 tons. This exceeded the May movement by 27,700 tons, but was about 18,000 tons less than for June, 1912. Shipments of steel rails and ties reached the unprecedented total of 278,000 tons, an increase of more than 63,000 tons over June, 1912. Both semi-manufactured products and structural shapes

showed a lighter movement than for the previous month and for last year.

Semi-finished steel is quieter, the export business having much trouble with Belgian competition. French producers have also begun to make their competition in export markets felt. Structural shapes are in a somewhat worse position than hitherto, the building trades continuing to show no life whatever. It is observed, too, that reinforced concrete building has been promoted by the fall in the price of bars and this tends still further to narrow the demand for beams. Work on rails continues at the utmost capacity of all the mills; orders are in hand for nearly a full year.

Various Finished Products

The position of plates is again weaker. The competition of the new mills still exerts pressure upon prices. In thin plates only mills most favorably situated are demanding as high as 130 marks a ton; those of the Siegerland district are selling as low as 128 marks and reports of prices as low as 125 marks are mentioned. Heavy plates are quoted at 120 to 122 marks.

Mills running on bands are still pretty well employed, but they are keenly competing for what new business comes upon the market, so that accommodation at 130 marks can already be had. Trade in wire rods continues to decline. The Wire Rod Association last week voted a cut of 5 marks to 122.50 marks, the reduction to apply also to orders already booked for this quarter. The June shipments of the association amounted to 34,200 tons, against 36,110 for May.

Gas and boiler tubes have fallen considerably since the efforts to organize this trade broke down. Reductions of 5 to 10 marks a ton have taken place; but it is said that the trade had looked for even heavier cuts.

The great Phönix Company has just bought extensive real estate at Hörde with a view to making large additions to its steel works and rolling mills.

St. Louis

ST. LOUIS, MO., July 21, 1913.

The activity noted for the past two weeks continues, and the sales in pig iron are mounting to good figures. In finished products there is still a tendency to bank tonnage for future orders, on the basis of playing safe for the present. In scrap the market continues stagnant, but with some slight hope appearing of an improvement. Material in all divisions except scrap is being urged forward, but in scrap an embargo is still maintained. Collections are good.

Pig Iron.—A considerable number of new inquiries have appeared and a number of good transactions were closed. The largest was that of the Alton Steel Company, which is now ready to operate and which took about 3000 tons of Southern basic iron, 1500 tons of Northern and 1000 tons of Bessemer. This was fought for pretty sharply and the prices are not available. Other sales of Southern iron during the week included one of 1000 tons, several of 500 tons and quite a number of transactions in smaller lots and one of 500 tons of carwheel iron. Deliveries are for the most part to be made during the last half. Inquiries still out in this market aggregate about 6000 tons, while still another inquiry for about 10,000 tons of basic is known to be about due and likely to appear during the week. There is an increasing disposition to seek pig for last quarter delivery and not a little for the first quarter and first half of next year, but these last the furnace representatives are not able to consider under instructions from their furnaces.

Coke.—The prices on coke continue to hold stiffly and the transactions are not numerous or of large tonnage. Purchasers are holding off in the apparent hope of a yielding on the part of the producers, but representatives are not encouraging them to do so. By-product coke stands at $5, Joliet, with little moving.

Finished Iron and Steel.—New business is light, though not materially off from the volume of structural orders reported for the past few weeks. There are strong indications that consumers are banking orders against the future with a view to playing safe on tariff and general business developments. The press for deliveries is sharp, evidencing clearly that the material being moved is much needed. Warehouse business generally continues good at firm prices. In steel rails, standard section, no new business appeared, though there are expectations of early inquiries from Southwestern systems. Track fastenings have been in fairly good request. Bars have been active, and prospective orders include about 3000 tons for a building at Kansas City for Montgomery Ward & Co., Chicago, and 1000 tons for a St. Louis hotel proposition now about to close. Agricultural and wagon interests are pressing hard for material and taking everything they can get.

Old Material.—The improvement in pig iron is having some slight effect, though the consuming interests have not as yet removed their embargos to any extent. This is especially true of the rolling mills, but the foundries are taking a little on contract to fill needs. Dealers are having difficulty in getting purchasers to take contracted lots, and about all they are doing in the way of buying is in the covering of contract deliveries. They are indisposed to purchase any more to put in the yards. Relayers continue hard to get, and a number of inquiries remain unfilled. The lists out during the week include 1000 tons from the Chicago & Eastern Illinois, 200 tons from the Chicago & Alton and 100 tons from the Wabash. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$11.00 to $11.50
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than three feet	10.00 to 10.50
Relaying rails, standard section, subject to inspection	23.00 to 24.00
Old car wheels	10.50 to 11.00
No. 1 railroad heavy melting steel scrap	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Frogs, switches and guards cut apart	9.75 to 10.25

Per Net Ton.

Iron fish plates	$10.50 to $11.00
Iron car axles	18.50 to 19.00
Steel car axles	14.50 to 15.00
Wrought arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.75 to 9.25
Railroad springs	7.50 to 8.00
Steel couplers and knuckles	7.50 to 8.00
Locomotive tires, smooth	10.00 to 10.50
No. 1 dealers' forge	6.00 to 6.50
Mixed borings	3.00 to 3.50
No. 1 busheling	8.00 to 8.50
No. 1 boilers, cut to sheets and rings	5.00 to 5.50
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	7.00 to 7.50
Railroad malleable	7.50 to 8.00
Agricultural malleable	6.50 to 7.00
Pipes and flues	6.00 to 6.50
Railroad sheet and tank scrap	5.00 to 5.50
Railroad grate bars	6.25 to 6.75
Machine shop turnings	4.75 to 5.25
Bundled sheet scrap	4.00 to 4.50

Buffalo

BUFFALO, N. Y., July 22, 1913.

Pig Iron.—The market has been quiet as regards business with New York State points, with slightly more activity noted on the part of New England users of foundry iron. Sales in that territory aggregated about 7000 or 8000 tons, the total sales for the week by Buffalo district furnaces amounting to about 12,000 tons. Although prices have shown a slight further recession as compared with the previous week, furnacemen seem to agree that they have now reached bedrock and that an unyielding front will be presented to buyers from new on. We quote as follows for last half delivery, f.o.b. Buffalo:

No. 1 foundry	$13.75 to $14.00
No. 2 X foundry	13.50 to 13.75
No. 2 plain	13.50
No. 3 foundry	13.50
Gray forge	13.50
Malleable	13.50 to 14.00
Basic	13.75 to 14.25
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	16.50 to 17.50

Finished Iron and Steel.—Midsummer is having the effect of slightly lessening specifications in some quarters, and a number of agencies report that those received during the week consisted largely of requirements placed to adjust stocks to the shorter deliveries which the mills are now able to make. A number of contracts expired June 30 and buyers are commencing to sound the market with a view of covering their last half requirements. As a whole, sentiment seems to be considerably better than for some weeks. The agency of the principal interest reports that contract inquiry has been quite a little better the past week and that pressure for delivery on specifications placed continues to be quite urgent; also that some classes of trade are now specifying for fourth quarter delivery and even into the first quarter of next year. No change has been made in the price of bars, plates or shapes, either mill or warehouse. In fabricated structural lines prices are

steady and conditions rather more favorable for the letting of contracts for work which, in some instances, has been held back for a considerable time. The Buffalo Structural Steel Company has been awarded contract for 150 tons for an addition to the plant of the Danahy Packing Company, Buffalo, and for a sub-exchange building for the New York Telephone Company, Buffalo, requiring about the same tonnage. The Lane Bridge Company, Painted Post, N. Y., has received contract for steel for a library building at Alden, N. Y., and for a heat treatment building, 100x250 ft., to be added to the plant of the Morrow Mfg. Company, Elmira, each requiring a moderate tonnage. The George Kellogg Structural Company, Buffalo, has the contract for steel for a high school building for Jamestown, N. Y., about 200 tons. Bids are soon to be taken for the steel for a large addition to the department store of Rothschild Bros., Ithaca, and for a carhouse for the International Railway at Niagara Falls, N. Y.

Old Material.—Considerable business is being done in borings and turnings, although it consists principally of small lots. There is also a moderate movement in heavy melting steel scrap. Large tonnage sales are scarce in all commodities, being restrained because dealers are in most instances holding for better prices which they believe will be obtainable later. On the other hand, there is so much stock accumulating on the market that users are not seeking supplies with any avidity. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$11.00 to $11.50
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Low phosphorus steel	16.50 to 17.00
Iron rails	15.00 to 15.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad and machinery cast scrap	13.00 to 13.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	13.00 to 13.50
Railroad malleable	12.00 to 12.50
Locomotive grate bars	10.00 to 10.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	9.50 to 10.00
Wrought iron and soft steel turnings	6.00 to 6.50
Clean cast borings	6.00 to 6.50
Bundled tin scrap	14.00

Boston

BOSTON, MASS., July 22, 1913.

Old Material.—The stagnation of the market continues. Dealers expect this condition to continue for several weeks, but believe that the mills will be compelled to buy before the end of August. Prices have not been changed. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.75 to $9.00
Low phosphorus steel	13.50 to 14.50
Old steel axles	13.50 to 14.00
Old iron axles	21.00 to 21.50
Mixed shafting	13.00 to 13.25
No. 1 wrought and soft steel	10.50 to 10.50
Skeleton (bundled)	7.50 to 8.00
Wrought-iron pipe	8.50 to 9.00
Cotton ties (bundled)	8.50 to 9.00
No. 2 light	3.50 to 4.00
Wrought turnings	5.25 to 5.50
Cast borings	5.25 to 5.50
Machinery, cast	11.50 to 12.00
Malleable	10.00 to 10.50
Stove plate	7.75 to 8.25
Grate bars	6.75 to 7.00
Cast-iron carwheels	13.50 to 14.00

The Charles H. Bond Company, 520 Arch street, Philadelphia, Pa., manufacturer of leather belting, is this month celebrating the twenty-fifth anniversary of its establishment, the business having been founded in 1888. In addition to the Charles Bond Company, and as outgrowths of the original business, there have been founded the following companies: Bond Foundry & Machine Company, Manheim, Lancaster County, Pa., and Canadian Bond Hanger & Coupling Company, Ltd., Alexandria, Ont., Canada.

British Iron Trade More Cheerful

Very Large Business Being Done in Semi-Finished Steel and Galvanized Sheets

(By Cable)

LONDON, ENGLAND, July 23, 1913.

A rather more cheerful feeling prevails, but buying is still generally reserved. Consumers of pig iron are apparently waiting to see what the Cleveland iron masters will do with their scheme to abolish warrant stores. The tone of the market for semi-finished steel remains firm, and a very large business has been done in this product and in galvanized sheets. The position of tin plates is no better, while business in finished steel is slow, with continued sharp German competition. Stocks of pig iron in Connal's stores are 199,034 tons, against 203,806 tons last week. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 55s. 1½d., against 55s. 6d. a week ago.

No. 3 Cleveland pig iron, makers' price f.o.b. Middlesbrough, 55s. 6d., against 56s. a week ago.

Ferromanganese, £11 2s., f.o.b. shipping port.

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £5.

German sheet bars, f.o.b. Antwerp, 87s. 6d.

German 2-in. billets, f.o.b. Antwerp, 80s.

German basic steel bars, f.o.b. Antwerp, £4 13s., a decline of 2s.

French blooms, 77s. f.o.b. shipping port.

French sheet bars, 82s. 6d. f.o.b. shipping port.

Steel bars, export f.o.b. Clyde, £6 17s. 6d., a decline of 2s. 6d.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £6 10s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 5s.

Steel rails, export, f.o.b. works port, £6 12s. 6d., a decline of 2s. 6d.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s., a decline of 1½d.

(By Mail)

Pig-Iron Market Limited—Low Prices on Sheet Bars—Finished Lines Tend Downward

LONDON, July 12, 1913.

The Cleveland pig-iron market is steady, there being no attempt to force taken-over holdings for sale; and with the pretty continuous withdrawals of metal from the stores the position looks sound enough. Makers are much dissatisfied at the prices of warrants, and in many cases have been asking a shilling a ton and more premium, the result being, of course, that what business was going went to the stores, whose stocks were thus steadily reduced. The Cleveland pig-iron masters are thoroughly disgusted with the warrant market, and are taking steps to put an end to it. Whether they will succeed remains to be seen. Meantime the amount of new business coming forward from the trade remains very limited. All over the country the disposition is to meet the views of consumers, who, however, are not to be tempted except for the smallest quantities. There is not any German competition in pig iron, but it is understood that a lot of 10,000 tons of Southern basic iron has been sold at 60s., c.i.f., Liverpool.

Rebound from Low Sheet Bar Prices

The market for semi-finished steel has been almost demoralized owing to the frantic efforts of the French works to get orders at any price, and one of our largest consumers late last week managed to pick up 15,000 tons at 79s. and 80s. f.o.b. Antwerp for sheet bars. This was the bottom of the market for the time, at all events, for prices at once took an upward turn, and today the Belgians are entirely out on sheet bars, while the French are only open to take very limited quantities at 84s., and the German Verband asks 87s. 6d., though it would no doubt accept less. A very large business has been done in the past two or three weeks, especially by the galvanized sheet mills, and just at present the tone is firmer. It is very doubtful

however, if this can be anything more than a flash in the pan, for at the same time that billets and sheet bars have firmed up, finished Continental iron and steel are worse than ever. Basic steel bars—rounds, flats, etc.—have been sold by works at £4 14s. 3d. f.o.b. Antwerp, and lower prices are still being quoted by works of the highest standing in Germany. The efforts to arrange a bar agreement for the German home trade have come to nothing, and this being the case it is no use looking for semi-finished products to maintain a permanently better position, in face of fundamental weakness in finished materials. The British bar-iron trade is now getting into a poor way, and it is felt that a reduction in the price of marked bars cannot be long deferred. There was anything but a cheerful tone at the quarterly meeting in Birmingham this week, tin plates in particular being very depressed. There is some inquiry for oil sizes for the East but America is not doing anything now. Cost of production has come down very greatly, and it is quite possible that works can make a profit on their tin plates at 13s. to 13s. 1½d. a box for base sizes now. Nearly 120 mills are still stopped and a great scramble is going on for the orders to be obtained.

For finished steel the demand is of the smallest and the tendency of prices is slack. Consumers are confident that the next move will be in a downward direction; it seems, indeed, that it must be and that the move cannot be long delayed. Joists [beams] have a specially slack tendency and new buying is of not the slightest account.

Shipbuilding Still Good

The shipbuilding returns just issued are very good, even though they fall short of those of the previous quarter. On June 30 there were building in the United Kingdom, exclusive of warships, 543 vessels of 2,003,241 tons gross, the tonnage being 60,000 less than at the end of March but 229,000 in excess of that a year ago. The new buying of ships has for months now been limited, owners not feeling themselves justified in contracting at the prices asked, and it is probable that the shipyards will have a quiet time of it for a while. Prices of steel are easy, and when things begin to look cheap and the financial position is relieved there will no doubt be a fresh turn of the wheel, but this is not likely just yet awhile.

New York

NEW YORK, July 23, 1913.

Pig Iron.—A feature of the situation is that the lower prices furnaces have named in the weeks that have passed since some of them were disposed to say that the bottom had been reached have caused no rushing in of buyers. The argument of higher cost of making iron, due to coke and ore advances, receives a respectful hearing, but consumers are less influenced by figures apparently than by the state of mind into which manufacturers and financiers have come. A good amount of business, though nothing remarkable, has been done in the past week at prices showing that firm ground has not been reached. Virginia iron is now quoted at $13 at furnace for No. 2 X, but this price, while permitting nearly even competition for some eastern Pennsylvania business against Lehigh and Schuylkill Valley furnaces, is not low enough to take New England business from Buffalo furnaces. The extent to which Buffalo prices have declined is not positively known, $13.25 for No. 2 X on some Eastern business being both affirmed and denied. Furnace interests assert that nothing below $13.50, Buffalo, can be traced in actual transactions. At $13.50 New England deliveries would stand at $15.95. It is asserted that a 3000-ton New England transaction, third quarter delivery, was put through at $15.70; on the other hand there is good authority for the statement that a higher price was paid. In this district 4000 to 5000 tons of open inquiries are pending, including a 1600-ton inquiry from a Hudson Valley point. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $15.75 to $16; No. 2 X, $15.25 to $15.50; No. 2 plain, $15 to $15.25. Southern iron is quoted at $15.50 to $16 for No. 1 foundry and $15 to $15.25 for No. 2.

Structural Material.—Six weeks ago it was thought that there would be little activity in the market until fall, but the past week has witnessed a change. The general sentiment is decidedly better. In addition to the large contracts involving about 10,000 tons, settled last week, others that have been before the trade for some time have been awarded. The Baltimore & Ohio Railroad has given the contract for the Glenwood bridge, No. 74, 3000 tons, to the American Bridge Company, and the addition to the B. Altman & Co. building, New York, 5000 tons, will go to the same interest. The American Iron & Steel Mfg. Company, Lebanon, Pa., has contracted with the American Bridge Company for the building for its new steel plant, 2200 tons, and Milliken Brothers are to furnish 2500 tons for the addition to the steel plant of the Bethlehem Steel Company. The decisions to go forward in both these cases are regarded as a good sign by the trade in general. Other undertakings that have been settled are the following: A transfer bridge, 400 tons, for the New York Central & Hudson River Railroad at Weehawken, given to the Phoenix Bridge Company; a bridge over the Still River, 150 tons, for the New York, New Haven & Hartford Railroad, and a new Masonic Temple building at Watertown, N. Y., 200 tons, both to the American Bridge Company. An apartment house at One Hundred and Forty-second street and Riverside drive, involving 800 tons, has gone to the Hinkle Iron Works. The first section of the Brooklyn Rapid Transit subway to be given out has gone to Terry & Tench, the steel for this, 600 tons, to be furnished by the Phoenix Bridge Company. Bids have gone in for a new building of 1800 tons for the General Electric Company at Pittsfield, Mass., and on Tuesday bids were submitted for 3000 tons for the Broadway and Fourth avenue subway. Deliveries are normal and plain material continues to be quoted at 1.45c., Pittsburgh, or 1.61c., New York, while quotations from store remain at 2.10c. to 2.15c.

Plates.—No large contracts are reported and the market is quiet. There is a fair volume of small orders, and deliveries continue prompt from any source. Orders for cars are very few. The Seaboard Air Line is reported to have ordered 10 coaches from the Pressed Steel Car Company and the New York Central 1000 steel underframes from the American Car & Foundry Company. Export demand is fair at 1.51c. to 1.56c., New York. We quote 1.50c., Pittsburgh, or 1.66c., New York, for delivery in from 10 days to two weeks, and 1.45c., Pittsburgh, or 1.61c., New York, for mill shipment in the last half. There is, however, some shading of 1.66c., New York, for early delivery, evidence appearing of sales at 1.45c., mill, or 1.61c., New York, indicating some softening of the eastern market and the coming on of more active competition for small lot business.

Bars.—There has been an improvement in the general sentiment the past week, and while buying is not on a large scale now, it is felt that by fall the amount of deferred demand will give the market another start. Deliveries are from six weeks to three months on the general run of steel bar specifications. In iron bars there is considerable competition, with consequent irregularity in prices. We quote 1.40c. to 1.55c., New York, though on ordinary scrap bars the lower of these prices has been shaded. The quotation for steel bars is still 1.56c., New York. We quote store prices at 2c. to 2.05c. for steel bars and 2.05c. to 2.10c. for iron bars.

Ferroalloys.—The inquiry for 80 per cent. ferromanganese has improved considerably, requirements representing about 3000 tons being out, mostly for forward delivery. In the matter of buying, however, consumers are proceeding slowly. The makers are adhering to their price of $58.50, Baltimore, and any large lots or material for future delivery would be pretty certain to bring this figure. There is still some prompt to be had at lower prices, though just how far concessions are carried cannot be stated with certainty. In 50 per cent. ferrosilicon there has been fair buying at unchanged prices, namely, $75 for carloads, $74 for 100 tons and $73 for 600 tons and over.

Cast-Iron Pipe.—The city of Schenectady, N. Y., rejected all bids submitted July 16 on 1500 tons and readvertised for new bids to be opened today. As far as known, the pipe has not yet been purchased by the Degnon Contracting Company, required for its contract for the extension of the New York high pressure fire prevention service. Although inquiry has but slightly increased, and no important lettings in this territory are in sight, a better feeling exists in cast-iron pipe circles, and larger business is quite confidently expected. Prices of carload lots of 6 in. are $23 to $24 per net ton, tidewater, New York.

Old Material.—No improvement is yet visible in the market for old material. Steel works and rolling mills show no interest in scrap, and the utmost efforts of dealers appear unavailable to move any quantities of

importance. Foundries are purchasing cast scrap to a limited extent only. Dealers' quotations, largely nominal, are unchanged as follows, per gross ton, New York:

Old girder and T rails for melting	$8.50 to	$9.00
Heavy melting steel scrap	8.50 to	9.00
Relaying rails	21.50 to	22.00
Rerolling rails	12.00 to	12.50
Iron car axles	20.50 to	21.00
Steel car axles	14.00 to	14.50
No. 1 railroad wrought	11.25 to	11.75
Wrought iron track scrap	10.50 to	11.00
No. 1 yard wrought, long	10.00 to	10.50
No. 1 yard wrought, short	9.50 to	10.00
Light iron	4.00 to	4.50
Cast borings	5.00 to	5.25
Wrought turnings	4.25 to	4.50
Wrought pipe	8.25 to	8.75
Carwheels	12.00 to	12.50
No. 1 heavy cast, broken up	10.25 to	10.75
Stove plate	7.50 to	8.00
Locomotive grate bars	7.00 to	7.50
Malleable cast	8.50 to	9.00

Metal Market

NEW YORK, July 23, 1913.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
July	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
17	14.50	14.12½	39.85	4.35	4.20	5.30	5.15
18	14.50	14.25	40.05	4.35	4.22½	5.30	5.15
19	14.50	14.25	.....	4.35	4.22½	5.30	5.15
21	14.50	14.37½	40.50	4.35	4.22½	5.35	5.20
22	14.50	14.37½	41.25	4.35	4.22½	5.40	5.25
23	14.50	14.37½	42.00	4.35	4.22½	5.40	5.25

Copper is higher following better buying, especially abroad. Tin is in better demand and quotations have advanced. Lead is a trifle firmer in the West. Spelter has advanced under better inquiry. Antimony continues dull at unchanged prices.

New York

Copper.—Europe began to buy freely in the latter part of last week and a good total was unquestionably taken. Reports had it that the sales amounted to 75,000,000 lb., but several authorities regard this figure as excessive. On the strength of the foreign movement American buyers came forward and bought, too, but to a comparatively small extent because they lacked confidence in the market. The buying was responsible for advances in price and electrolytic is quoted to-day at 14.37½c. The movement abroad was started in England by one manufacturer, it is understood, extended to France and Germany and then had its influence here. Early shipment of electrolytic is not altogether easy to obtain, partly because of the strike at the Nichols refinery at Laurel Hill, L. I. Domestic consumption has fallen off rather than increased. In Lake copper there has been little business and the quotation of 14.50c. is nominal, although some Lake was exported last week. It is reported that some sellers have withdrawn for the time being because they are anticipating better prices. The price in London to-day is £64 17s. 6d for spot and £65 for futures. Exports this month amount to 18,033 tons.

Pig Tin.—Consumers came forward with a little better demand for spot or early shipment in the last week, the inquiries showing that their stocks had been permitted to get very low. As the result of the increased demand consumers have not found it easy to get prices which are satisfactory to them. On Friday afternoon last, for instance, in the course of rather light trading, the market advanced 20 points, sellers taking the stand that better prices might reasonably be expected in view of the not too large supply then available and the fact that the demand was fair. In a day or two, however, to the short stocks will be added 1200 tons which arrived on the Minnewaska. Quotations advanced in London but this was due only in part to the American demand, a more important factor being the effort there to cover short contracts. The London quotation to-day is £190 10s. for spot and £190 for futures. There is afloat 1107 tons, while arrivals this month total 3820 tons.

Lead.—In this metal there has been an improved demand for the reason that consumers' stocks had got down to rock bottom. The result was better buying in the latter part of last week which tapered off as soon as wants were covered, but left prices in the West a little higher. It is evident in this metal, as in others, that consumers are not carrying any more reserve stocks than they need. Lead is quoted in New York to-day at 4.35c. and at St. Louis at 4.22½c.

Spelter.—Moderate buying by consumers, with apparently less pressure to sell on the part of the makers and agencies, has led to a stiffening of spelter prices which are quoted to-day at 5.40c., New York, and 5.25c. St. Louis. The buying has been mostly for nearby positions showing that consumers have no extended supply on hand.

Antimony.—This market continues to be described as dull and neglected by all concerned. Hallett's is quoted at 7.75c. to 8c., Cookson's at 8.40c. to 8.50c. and Chinese and Hungarian grades at 7.50c. to 7.75c.

Old Metals.—The market is quiet. Dealers' selling prices are nominally unchanged, as follows:

	Cents per lb.
Copper, heavy and crucible	13.75 to 14.00
Copper, heavy and wire	13.50 to 13.75
Copper, light and bottoms	12.50 to 12.75
Brass, heavy	8.75 to 9.00
Brass, light	7.50 to 7.75
Heavy machine composition	12.75 to 13.00
Clean brass turnings	8.50 to 8.75
Compo ition turnings	11.25 to 11.75
Lead, heavy	4.25
Lead, tea	4.00
Zinc, scrap	3.85

Chicago

JULY 21.—Sales of copper are not numerous, recent buying by important consumers having been sufficient apparently to cover their requirements through the third quarter. Prices are being firmly held by the larger interests, but concessions are also noted. Lead quotations are steady, though business is dull. Spelter prices show little change for immediate delivery, but for future shipment advances are being asked. For scrap metals dealers are less inclined to offer attractive prices. We quote as follows: Casting copper, 14.75c.; Lake, 15c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 40.75c.; small lots, 43c.; lead, desilverized, 4.30c. to 4.35c.; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.25c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is $7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 12.50c.; copper bottoms, 11.25c.; copper clips, 12.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 3.50c.; zinc, 3.75c.; pewter, No. 1, 26c.; tinfoil, 32c.; block tin pipe, 36c.

St. Louis

JULY 21.—The metal market has been rather quiet, and purchases have been for only normal quantities to meet needs. Lead is quoted at 4.20c.; spelter, 5.20c.; tin, 40.22½c. to 40.35c.; Lake copper, 14.72½c. to 14.97½c.; electrolytic copper, 14.72½c. to 14.87½c.; Cookson's antimony, 8.75c. to 9.20c. In the Joplin ore market there was a better feeling during the week and prices firmed up considerably. Zinc sulphide ores brought $43 to $45 per ton as a range on basis ore, 60 per cent., while the top settlement for the choicest ores on the basis was $48. Calamine brought $21 to $23 on a basis of 40 per cent., while the choicer ores sold up as high as $26. Lead ore was unchanged at $52.50. Shipments are increasing, due to the better prices obtainable. On miscellaneous scrap metals we quote as follows: Light brass, 5c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 10.50c.; zinc, 2.50c.; lead, 3c.; pewter, 21c.; tinfoil, 27c.; tea lead, 2.75c.

The Fore River Shipbuilding Company, Quincy, Mass., is reported by a Boston newspaper to be bidding on eight ore carriers for the Bethlehem Steel Corporation and three steamships for the Hamburg-American Line. The Bethlehem ships, which are to ply between Chilean and United States ports, are to be of about 25,000 tons displacement each and will have capacity for 17,000 tons of ore. They will be about 600 ft. long. The ships for the Hamburg-American Line are each to be a little less than 600 ft. long, and to cost probably $2,000,000 each. It is presumed that these ships are intended for the United States domestic service and possibly to run through the Panama Canal.

The rapidly growing popularity of wire wheels in this country has led the McCue Company, Buffalo, N. Y., to more than double its capacity to take care of the present demand. Even before completion of the factory additions thus undertaken it has become necessary to make further plans to meet the constantly increasing business in this line.

Personal

The Chicago City Council has selected John F. Wallace, president of the engineering firm of Westinghouse, Church, Kerr & Co., 37 Wall street, New York City, as its expert adviser on the future railroad terminals of the city, including location of passenger and freight terminals, possible consolidation of rights-of-way, the question of whether there should be a union terminal or separate stations for different groups of roads and the formulation of a policy which the city can follow in the future. Mr. Wallace, who has been prominent in engineering for many years, having been chief engineer and later vice-president of the Illinois Central Railroad, and in 1904 was appointed chief engineer of the Panama Canal, for which he created the initial organization, formerly lived in Chicago and is thoroughly familiar with the terminal situation there.

John Birkinbine, consulting engineer and one of the leading American authorities on hydraulic engineering, Odd Fellows Temple, Philadelphia, Pa., has been reappointed as a member of the State Water Supply Commission of Pennsylvania by Governor Tener. Mr. Birkinbine was president of the commission when it was originally formed and was the only member to be reappointed by former Governor Pennypacker in 1905. He has been president of the Franklin Institute, the American Institute of Mining Engineers, the Engineers' Club of Philadelphia and the Forestry Association of Pennsylvania.

John O. Pew, vice-president and general manager of the Youngstown Iron & Steel Company, Youngstown, Ohio, has returned to business after a protracted stay at Danville, N. Y., for the benefit of his health.

Samuel Porcher has been appointed purchasing agent of the Pennsylvania Railroad, succeeding the late Daniel G. Newhall. Mr. Porcher is a graduate of the University of Virginia. He entered the machine shops of the Pennsylvania Railroad in 1882, and in 1888 became connected with the office of the chief mechanical engineer and later was made engineer of the power department of the New Jersey Division. In 1894 he was made assistant purchasing agent, which position he held at the time of Mr. Newhall's death.

A. K. Andrews, general manager Andrews Steel Company and Newport Rolling Mill Company, Newport, Ky., is spending his summer vacation at Muskoka Lakes, Canada.

W. R. Walker, assistant to the president, United States Steel Corporation, sails for Europe Saturday.

H. F. Panfield, manager of the Pittsburgh office of the National Roll & Foundry Company, has resigned and will engage in the manufacture of brick at Ironton, Ohio. He is succeeded by A. J. Baird.

W. A. Miller, formerly of the Pittsburgh office of Joseph T. Ryerson & Son, has been transferred to the main office at Chicago, where he will represent the mill department.

Harry W. Finnell, who for some time has been Eastern representative of the Carbon Steel Company as manager of railroad sales, has been appointed assistant to the president of that company, in general charge of sales. He sailed for Europe a few days ago in the interests of the company's export business, which has been constantly increasing, and on his return will make his headquarters in Pittsburgh.

Ferd. Wilckes, treasurer of the Athenia Steel Company, 135 William street, New York, is now traveling through Sweden and England in the interest of the company. He will probably be abroad all summer.

R. Winthrop Pratt, Hippodrome Building, Cleveland, Ohio, has been appointed consulting engineer to the Cleveland water department for the preparation of detailed plans for the proposed 225,000,000-gal. filtration works. He has been in charge of the sewage disposal investigations for the city for the past year.

R. A. Ellis, with David Evans & Co., Chicago, who has been confined to St. Luke's Hospital as the result of being run over nine weeks ago and suffering a crushed hip, is especially unfortunate in that recent complications will delay his recovery for several weeks.

C. H. Burt, formerly general superintendent for the Barber-Coleman Company, Rockford, Ill., has resigned to accept the position of works manager for the Russell Motor Car Company, Toronto.

Hugh M. Craig has been appointed assistant to the general manager of the Janesville Machine Company, Janesville, Wis., in charge of publicity and general promotion work. His former position as sales manager will be filled by C. S. Slaker, who has been with the company as Southwestern representative.

The Webster Mfg. Company, Tiffin, Ohio, announces that T. K. Webster, for many years its president and one of the principal stockholders, has severed his connections with the company. The officers are now as follows: F. S. Shaw, president; A. T. Perkins, vice-president and general manager; Alexander Kiskadden, vice-president; Charles S. Clarke, treasurer; L. H. Webster, secretary.

H. J. Byers has resigned as superintendent of Fannie furnace of the United Iron & Steel Company at West Middlesex, Pa., and has been succeeded by John Wren, formerly in charge of the blast furnace of the company at Leetonia, Ohio.

Obituary

ANDREW JACOB VOLLRATH, Sr., president and general manager of the Porcelain Enameling Association of America, Sheboygan, Wis., one of the largest producers of enameled ware in the United States, died after a short illness on July 14, aged 63 years. He was born in Milwaukee and in 1854 went with his parents to Sheboygan, where his father established a farm implement works, under the name of Jacob J. Vollrath & Son. Later this was changed to Jacob Vollrath Mfg. Company. In 1907 A. J. Vollrath, Sr., with his sons, established an enameling and stamping plant at Sheboygan under the corporate style above given.

EPHRAIM BAYARD, superintendent of the Donora plant of the American Steel & Wire Company, died in the West Penn Hospital, Pittsburgh, July 20, following an operation. He was 45 years old.

J. F. Townsend, traffic manager of the National Tube Company, Pittsburgh, has issued anew this company's well-known map of the Pittsburgh District, showing railroad terminals and locations of iron and steel works having track connections, and has indicated by a ten-mile circle about the business center of Pittsburgh the limits of the Pittsburgh Metropolitan District. This district, according to the last report of the Census Bureau, had a population of 1,042,855, and on this basis the district is called the fifth city.

The Moline Pressed Steel Company, Moline, Ill., maker of accessory parts for agricultural implements, reported a year of very gratifying business at its recent annual meeting. For the ensuing year officers were re-elected as follows: President, Fred Lundahl; secretary, William H Powell; treasurer, Robert Alexander.

The William Cramp Ship & Engine Building Company, Philadelphia, launched July 19 the steamship Santa Catalina, building for W. R. Grace & Co. of New York. It is 420 ft. long, 54 ft. beam, of 10,000 tons capacity and will be used in the Panama Canal trade.

The Belfont Iron Works Company, Ironton, Ohio, has decided to dismantle its cut nail factory, which has not been operated for some years. The company was formerly a very large maker of cut nails, but for some years has made wire nails exclusively.

The Acme Boiler Works, Canal Dover, Ohio, has been purchased by Godfrey Smith, who has been operating the plant for a year, under a lease from the creditors.

The Empire Steel & Iron Company will blow out its blast furnace at Topton, Pa., next week.

Pittsburgh and Vicinity Business Notes

The Scottdale Machine & Mfg. Company, Scottdale, Pa., has been incorporated with a capital stock of $100,000, and will take over the Scottdale Foundry & Machine Company. It will need no new equipment.

The Cambria Coal Company is making power house improvements at its coal mines located near Barnesboro, Pa. It is understood that a 200-kw. motor-generator set and three 75-kw. transformers will be installed.

Curry & Co., Oliver Building, Pittsburgh, have recently placed on the market a submerged coal washing jig.

The Summers Steel Car Company, Oliver Building, Pittsburgh, is delivering 100 all-steel 100,000-lb. box cars of its own design to the Bessemer & Lake Erie Railroad for hauling Portland cement. The cars are equipped with Summers balanced side-bearing trucks.

It is announced that as a result of the failure July 7 of the First-Second National Bank, Pittsburgh, in which the Kuhn interests were heavily involved, work on the hydroelectric development on the Cheat River at Cheat Haven, Pa., has been stopped and the workmen paid off and discharged.

The Independent Bridge Company, Pittsburgh, has been awarded a contract by the United States Government for the erection of lock gates on the Columbia River, Oregon, and Coosa River, Alabama. The Columbia River contract calls for 22 pairs of gates, ranging from 36 to 50 ft. in hight, to be used in the construction of 10 miles of the Dallas-Celilo canal, and will require 1150 tons of structural steel. The Coosa River improvement provides two pairs of gates for lock No. 4.

C. C. Ramsey, Herbert DuPuy, James Park, J. W. Dougherty and W. C. Rice, officials of the Crucible Steel Company of America, Pittsburgh, and T. Hart Given, of the Farmers Deposit National Bank, Pittsburgh, are organizing the Midland Savings & Trust Company at Midland, Pa., to have a capital stock of $125,000. It will be largely for the convenience of employees of the Pittsburgh Crucible Steel Company.

The Riter-Conley Mfg. Company, Pittsburgh, has received a contract from the Cleveland Construction Company, Cleveland, Ohio, for 2400 ft. of 4-in. pipe, and also a contract from the Aluminum Ore Company, Pittsburgh, for the erection of eight precipitator tanks to be 23 ft. in diameter and 75 ft. 9 in. in hight, taking about 435 tons of plates.

The Rosedale Foundry & Machine Company, North Side, Pittsburgh, has received a contract for the installation of Playford chain grate stokers to operate 6000-hp. Sterling boilers in the power plant of the Phillips Sheet & Tin Plate Company, Weirton, W. Va., and in the Pope works of the same company at Steubenville, Ohio. It will also install stokers for the operation of six 475-hp. Keeler boilers in the Aspinwall pumping station, Pittsburgh, and stokers for the Baltimore & Ohio Railroad depot and for the new power plant of the Armstrong Cork Company, Pittsburgh.

The Chester B. Albree Iron Works, North Side, Pittsburgh, has received a contract for installing pneumatic riveting equipment in the new plant of the Canadian Car & Foundry Company at Westford, Ont. The order calls for 15 toggle-joint pneumatic riveting machines ranging from 12 to 110 in. capacity. Eight of the machines are for 15-in. work, two for 24-in., one for 26-in., two for 66-in. and two for 110-in. This type of riveting machine was selected by the Canadian company after an inspection of the work being done by similar machines in the erecting departments of the Standard Steel Car Company, Pressed Steel Car Company and American Car & Foundry Company.

The Pennsylvania Glue Company, Springdale, Pa., will make improvements to its plant. It has given a contract for pumping machinery to the Epping-Carpenter Company, Pittsburgh, and for a pumping station, connections to well system and piping to the Pitt Construction Company, also of Pittsburgh. Chester & Fleming of that city are engineers for the work.

The Schick Wheel & Tire Company, Wheeling, W. Va., has been incorporated with $150,000 capital stock by Adolph Schick, J. E. Morgan, D. H. Taylor, L. F. Gundling, R. Walter Marshall and O. A. Statler, all of Wheeling, to manufacture an automobile wheel, the spokes of which are made of spiral springs designed to do away with pneumatic tires.

R. M. Rush, Olivet Building, Pittsburgh, representative of the Kerr Turbine Company, Wellsville, N. Y., and the Falk Company, Milwaukee, has received an order for 16 steam turbines from the Henry R. Worthington Company, Pittsburgh. The order includes eight 200-hp turbines, with Falk herringbone reduction gears to drive circulating pumps, and eight 40-hp turbines direct connected to hot well pumps. The equipment will be installed at the Brunots Island power station of the Pittsburgh Railways Company in connection with surface condensers which the Worthington Company is installing on three 20,000-kw turbine generators.

The Epping-Carpenter Pump Company, Pittsburgh, has recently placed contracts for doubling the capacity of its extensive foundry. One of this company's recent orders is for a compound pot valve woodlined pump for the H. C. Frick Coke Company. This pump is built to handle 3500 gal. of water per min.

The A. M. Byers Company, Pittsburgh, manufacturer of wrought-iron pipe exclusively, has issued a circular giving an illustration of a piece of Byers 6-in. pipe taken from Grant street, Pittsburgh, by the Philadelphia Company, in connection with the removal of the famous "hump," after 28 years of uninterrupted underground service, with not more than 3 per cent. loss in weight. The excellent condition of this pipe after such long use is referred to by the company as an assurance that when the name of Byers is on pipe a reliable product is being obtained. The circular states that Byers pipe is manufactured from all straight pig muck bar without the use of steel or scrap of any description.

The Clarksburg Gas & Electric Company, Clarksburg, W. Va., will erect a large power plant at that point.

The Latrobe Automobile Turntable & Jack Company, Pittsburgh, has been granted a charter with a capital stock of $100,000, to manufacture machinery of all kinds and appliances relating to turntables and jacks. Its plant will be located at Latrobe, Pa.

The Carnegie Steel Company is building a playground at its Homestead works, Munhall, Pa., and it is contemplated to equip it with a moving picture show.

Iron and Industrial Stocks

NEW YORK, July 23, 1913.

The stock market has shown a decided turn for the better. Prospects are more encouraging for peace in the Balkans, and European financial conditions are growing easier. Prices of most stocks have made sharp advances. Republic Iron & Steel stocks made a spectacular jump on Tuesday, due to the excellent semi-annual statement. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.....	28½- 33⅛	Railway Spring, com.	24¼- 25⅛
Am. Can, pref.....	87⅞- 93½	Republic, com.....	19⅛- 24
Am. Car & Fdy., com.	42 - 44	Republic, pref.....	77½- 86⅞
Am. Car & Fdy., pref.	110 -111	Rumely Co., com...	16⅞- 17½
Am. Loco., com....	28½- 30½	Rumely Co., pref...	38 - 39¾
Am. Loco., pref....	100 -100⅞	Sloss, com.....	26
Am. Steel Foundries	27 - 28¼	Pipe, com.....	10½- 11
Bald. Loco., com.....	41	Pipe, pref.....	47½- 48
Beth. Steel, com...	29 - 33¾	U. S. Steel, com...	53¼- 57⅛
Bald. Loco., pref.....	103	U. S. Steel, pref..	105 -107⅛
Beth. Steel, pref...	67⅛- 71¼	Va. I. C. & Coke...	37 - 39
Colorado Fuel	28 - 30¾	Westinghouse Elec..	58 - 62½
General Electric....	139½-140⅛	Chic. Pneu. Tool...	49¼- 51½
Gr. N. Ore Cert...	32½- 34	Cambria Steel	44¼- 47⅛
Int. Harv., com....	104¾-105	Lake Sup. Corp....	22 - 25
Int. Harv., Corp...	104¾-106	Pa. Steel, pref.....	64⅜- 66
Int. Pump, pref.....	23	Warwick	10
Nat. En. & St., com.	11 - 12	Crucible Steel, com.	13¼- 13⅜
Pittsburgh St., pref.	92¾- 94½	Crucible Steel, pref..	85 - 87½
Pressed Steel, com..	23 - 24½	La Belle Iron, com.....	47¼
Pressed Steel, pref.....	92¾		

Dividends Declared

The Cambria Steel Company, regular quarterly, 1¼ per cent., payable August 15.

The Dominion Steel Corporation, regular semi-annual, 1½ per cent. on the preferred stock, payable August 1.

The Pressed Steel Car Company, regular quarterly, 1¾ per cent. on the preferred stock, payable August 21.

Republic Iron & Steel Co.'s Half Year

Net Profit for Six Months $1,972,420, Against $474,490 in First Half of 1912

The Republic Iron & Steel Company has issued its semi-annual financial statement, covering operations for the six months ended June 30, 1913, together with a comparative statement of income for the six-month periods ended December 31, 1912, and June 30, 1912. The comparative statement of income is as follows:

	Six months ended June 30, 1913	Six months ended December 31, 1912	Six months ended June 30, 1912
Net earnings from operations, after deducting charges for maintenance and repairs of plants, amounting to: June 30, 1912, $896,644; December 31, 1912, $880,535; June 30, 1913, $872,902	$2,776,647	$2,570,574	$956,355
Interest and dividends received, less interest paid	31,782	31,129	57,249
Total profit for the six months	$2,808,429	$2,601,703	$1,013,604
Less: Provision for depreciation and renewal of plants	283,391	251,596	87,746
Provision for exhaustion of minerals	112,145	123,726	91,723
	$395,536	$375,322	$179,469
Net profit for the six months	2,412,893	2,226,381	834,135
Deduct: Interest on bonds and notes	440,473	467,295	359,645
Net profit applicable to dividend	$1,972,420	$1,759,086	$474,490
Add: Surplus December 31, 1911	.....	.....	5,286,218
Surplus July 1, 1912	.....	5,339,891	.....
Surplus December 31, 1912	6,661,478	.....	.....
	$8,633,898	$7,098,977	$5,760,708
Deduct: Special appropriations from surplus account	.....	.....	420,817
Dividends on preferred stock: One quarterly of 1¼%	.....	437,500	.....
Two quarterly of 1¼% each	875,000	.....	.....
Net surplus carried to balance sheet	$7,758,898	$6,661,477	$5,339,891

The balance sheet shows net current assets June 30, 1913, of $13,072,051.81, including $3,700,370.30 in cash, with current liabilities of $3,147,517.55, and reserve funds as follows:

Exhaustion of minerals, etc	$1,829,567.76
Depreciation and plant renewals	2,107,105.51
Relining and rebuilding furnaces	395,732.47
Fire and accident insurance	386,600.63
Contingencies	101,075.32

The bonded indebtedness June 30, 1913, was $14,991,691, and collateral notes for $2,000,000, due November 24, 1913, were outstanding, as well as dividend warrants for $361,474, payable in equal annual instalments from October 1, 1913, to 1915, inclusive.

From accompanying remarks by John A. Topping, chairman of the executive committee, the following extracts are taken:

Income for the period ended June 30, 1913, shows that substantial growth in the volume of business was realized, all previous records having been exceeded; values of all products were also well sustained, Southern foundry pig iron excepted, the last-named product having continuously declined since the period of the last report, present values being now at the minimum, and at or below general cost of production. Two of the new merchant bar mills were placed in operation during the past two months. The balance of the construction work under way has been somewhat delayed by the unprecedented Ohio floods. It is expected, however, that the extension to the open-hearth steel works will be ready for operation by September 1; the 20-in. jobbing mill, October 1, and the 10-in. continuous mill, May 1, 1914. No benefits of consequence can be expected from the by-product coke works, in process of construction, prior to May 1, 1914.

Net profits, it is estimated, were decreased by approximately $400,000, due to direct and consequential losses suffered from the Ohio district floods. Important additions during the past six months have been made to the iron ore reserves without increasing capital account; aside from the additions to property value, outstanding notes to the amount of $1,000,000, issued on account of new construction, were retired. No important financing is contemplated, the working capital balance being amply sufficient for present requirements.

Orders on hand June 30, 1913, compare favorably with the record period December 31, 1912, and show a substantial increase as compared with the same period for the preceding year, definite contract amounts only being considered. Comparisons follow:

Finished and Semi-Finished Products

	Tons
June 30, 1913	504,928
December 31, 1912	613,053
June 30, 1912	454,961

Pig Iron

June 30, 1913	59,906
December 31, 1912	92,757
June 30, 1912	96,935

New business for the past three months has been most inactive. Specifications against contracts, however, have been normal and deliveries urgent, thus indicating an absence of speculative buying and that stocks generally are low. There should be an increase in business activity in the near future which, if realized, considering the large amount of unfilled orders on hand, suggests satisfactory operations during the balance of the year.

A Huge Motor-Driven Boring and Turning Mill

The Niles-Bement-Pond Company, 111 Broadway, New York City, has been awarded the contract by the Navy Department for furnishing one 36-ft. boring and turning mill for use at the Brooklyn Navy Yard. This machine which is the largest of its kind ever built in the United States if not in the world, will be used for machining the tracks upon which the warship turrets run. The table of the mill will be driven by a gear which is 28 ft. in diameter. The spindle is 30 in. in diameter and the faces of the cross rail and the uprights measure 4 and 2 ft. respectively. The bed is 25 ft. in width. The over-all hight of the mill is 27 ft. and the weight is over 600,000 lb. A 75-hp. motor will be used for driving the machine.

The building trades lockout in Chicago, which was put in effect June 19, has been ended by agreement to submit the questions in dispute to the arbitration board. Nearly 30,000 men have gone back to work and building operations are being resumed on work aggregating in value $40,000,000. Among the structures affected are the following: Consumers Building, Continental and Commercial National Bank, two Marshall Field Buildings, Conway buildings, Reid-Murdoch Building, Charles A. Stevens Building, Webster Annex, Fort Dearborn Hotel, Jarvis Hunt Building, Commonwealth Edison, Ford Motor Company, County Hospital, Northwestern University buildings, and six buildings costing $10,000,000 in the stock-yards.

David Flickwir, Roanoke, Va., railroad contractor, has bought the property of the West End Furnace Company, Roanoke, concluding negotiations with the New York holders of the company's bonds. The furnace was operated for only a short period after the receivership of 1911. The new owner has also acquired an iron mine at Interior, Giles county, Va., which has heretofore given the furnace a part of its supply. No definite plans for resumption at the furnace are announced. Mr. Flickwir was connected with blast furnace operations some years ago, at one time owning the Gem furnace, Shenandoah, Va., now the property of the Alleghany Ore & Iron Company.

Corrigan, McKinney & Co., Cleveland, Ohio, have placed with the United Engineering & Foundry Company, Pittsburgh, Pa., a contract for a 40-in. blooming mill, with tables, manipulator, etc., for their new steel plant in Cleveland.

The Genesee furnace of Corrigan, McKinney & Co., at Charlotte, N. Y., which was recently blown out, is being relined. An engine will be installed for lighting purposes and some other improvements made.

The Layman-Carey Company, wholesale hardware, Indianapolis, Ind., was burned out July 20, with a loss in stock and fixtures of $215,000; insurance, $172,000.

The Machinery Markets

In every section of the country there is an absence of big deals, but more or less improvement in the volume of small orders has been felt in a number of cities in the past few days. In New York the general trade has been quiet, although in some instances good sales have been made, principally by those handling special machine tools. In Philadelphia there has been a little more activity, especially in heavy tools. Reports from New England manufacturers are irregular and on the whole there has been some falling off from the records of May and June. Cleveland has had a fairly satisfactory number of scattered small orders and in that city it is noted that some good business is held up. Trade is hampered in Cincinnati by labor unrest which has caused hesitation in plant extensions, although the effect is not as bad as it would be at a busier time. In Detroit, the small miscellaneous demand has been livelier, though it is noted that there has been no buying of importance by automobile makers. Conditions in Milwaukee are irregular, some shops operating at capacity, while others are working from 50 to 75 per cent. The central South is finding the demand for boilers and power machinery exceptionally good, likewise that for ice machinery and some other lines. In the Birmingham district business is normal for the season, with plenty of business coming from the mines and the outlook reported as good. St. Louis is fairly active considering the season and regards the future with optimism because of the excellent crop prospects. In Texas the machinery trade is good for this time of the year and greater activity is expected to follow the gathering of the cotton crop. On the Pacific coast orders for machine tools have increased in number, but the improvement is not great and a number of good propositions are known to be awaiting the outcome of the tariff question.

New York

NEW YORK, July 23, 1913

The market is practically without change since the last report. As was said a week ago the trade generally is quiet, although some fair sales have been made by representatives of a few houses who manufacture special machine tools. These salesmen agree, however, that inquiries are fewer and not nearly as promising as they should be. In most quarters not much improvement is looked for until fall. Orders of recent date have been placed almost entirely by large companies. The Virginian Railway closed in the latter part of last week for an extensive list of tools and equipment for its Princeton, W. Va., shops, but otherwise railroad business has been very light. Collections are reported as slow by several of the trade.

Manning, Maxwell & Moore, Inc., who have been located for many years at 85-87 Liberty street, New York, have taken a long term lease on the twentieth and twenty-first floors of the new Lewisohn Building, 113 to 119 West Fortieth street, running through to Forty-first street. The move will give the company 24,000 sq. ft. for its general offices and those of its subsidiary companies. No part of the old offices, which have been inadequate for some time to properly meet the needs of the company, will be retained. The new offices will probably be occupied by October 1. The removal uptown of the company has excited not a little comment in the trade inasmuch as some consider the change from what has been considered the machinery district a radical one for such a large company. It is pointed out, however, that the section to which Manning, Maxwell & Moore are going is now a great railroad center since the Pennsylvania Railroad completed its uptown station. The fine new station of the New York Central has also enlivened the district. There is a further tendency on the part of some trades at least to locate conveniently to the big hotels. With the recent passing of the old Astor House not a single large hotel is left in the downtown business district. Several other large companies in the machinery or allied lines already have gone uptown, among them the H. W. Johns-Manville Company, the Yale & Towne Mfg. Company and Crocker Brothers, the last named dealers in pig iron and coke. Most of the trade are of the opinion, nevertheless, that the vicinity of the Hudson Terminal Buildings will long remain the machinery center of the city.

Extensive additions are to be made to the Adriance-Platt branch of the Moline Plow Company at Poughkeepsie, N. Y. Arrangements were already underway for the enlargement of the plant for the manufacture of mowers and harvesting machinery, and now it is planned to build shops at a cost of $250,000 for the manufacture of chilled plows. The new plant will consist of a foundry, 70 x 200 ft.; factory, 80 x 150 ft., and warehouse, 105 x 150 ft. The factory and warehouse will be four stories and basement. Material used will be brick and concrete. George H. Carver, manager of the Adriance-Platt branch, will have charge of the new plant.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the general contract for the construction of a reinforced concrete warehouse, 138 x 170 ft., seven stories, for the American Dock Company at Tompkinsville, S. I. Details of the machinery requirements are not available at the present time, but it is considered improbable that any extensive mechanical equipment will be installed.

The Commercial Machine Company, Dunkirk, N. Y., has leased a building containing about 8000 sq. ft. which will be devoted to the manufacture of cam shafts for gas engines. The company states that machinery has been installed for an output of from 25 to 60 cam shafts per day.

The Hope Knitting Company, Cohoes, N. Y., has leased the Standard Knitting Company's mill on Remsen street and will equip and operate it in addition to its present plant on Oneida street.

The village of Dobbs Ferry, N. Y., will build an incinerator plant. Plans are being considered by the Village Board. Address F. Q. Brown, president.

The Firth Carpet Company, Auburn, N. Y., has let the contracts for the construction of a weave house and dyehouse, each 80 x 100 ft., one story, and a boiler house 50 x 64 ft. The estimated cost of improvements is $90,000.

The Utica Steam & Mohawk Valley Cotton Mills Company, Utica, N. Y., will construct and equip an extensive addition to its boiler house.

The Foster Machine Company, Syracuse, N. Y., is having plans prepared for a two-story machine shop, 37 x 76 ft., which it will erect on South West street.

The Nunda Casket Company, Nunda, N. Y., will this fall add to its motive power and electric lighting equipment one 125-hp. boiler, one 150-hp. Corliss engine and two electric generators.

The Delaware, Lackawanna & Western Railroad Company will build a boiler house, 45 x 69 ft., one story, with a steel trussed roof, at Elmira, N. Y. Bids will be received by the company at Hoboken, N. J., this week.

The J. N. Cooper Laundry Company, Elmira, N. Y., will build a two-story addition to its laundry plant, 37 x 150 ft.

Duncan W. Peck, state superintendent of public works, Albany, N. Y., will receive bids until August 5 for power plants, electrical equipment and machinery for operating and lighting Erie Barge Canal locks Nos. 20, 21, 22, 23 and 25, the junction lock at New London and Oswego Canal locks Nos. 3, 5 and 6.

The Owego Light & Power Company is planning to install an additional 150-hp. water turbine. The purchase will be made shortly. Address D. C. Newton, superintendent.

The Norwood Electric Light & Power Company, Norwood, N. Y., will soon remodel and enlarge its power plant.

The Andrews Sons Company flourmill at Penn Yan, N. Y., was destroyed by fire July 10, with a loss of $60,000 on building and machinery.

The Depew & Lancaster Light, Power & Conduit Company, Lancaster, N. Y., which is adding about five miles to its low tension electric lighting system, will

soon install three 200-kw, 25-cycle, transformers for 11,000-volt primary, 22-volt secondary. Also one 11,000-volt, three-phase, 25-cycle oil breaker. Address A. R. Tremaine, superintendent.

The Niagara Searchlight Company, Niagara Falls, N. Y., is taking bids for a two-story factory building for which it has just completed plans.

The plant of Sowers Mfg. Company, 1300-1310 Niagara street, Buffalo, manufacturer of special machinery, drop forgings and castings, was damaged by fire July 15 to the extent of $25,000 on building and equipment. Repairs and replacement will be made at once.

Pratt, Reed & Phillips, Waterford, N. Y., were low bidders at $230,000 for the construction of the sewage pumping station to be built by the city of Schenectady, N. Y.

The Lefever Arms Company, Syracuse, N. Y., has purchased a portion of the plant formerly used by the Stearns Steam Car Company on Matbie street. The property adjoins the present factory and will be used for the manufacture of automobile transmission gears.

Bids will be received until August 5 by D. W. Peck, superintendent, Albany, N. Y., for a power plant and electric equipment.

The Compton Realty & Construction Company has received the general contract for erection of the heat treatment building, 100 x 250 ft., one story, at the plant of the Morrow Mfg. Company, Elmira, N. Y.

Plans are being completed by the Erie County Electric Company, Erie, Pa., to build additional three-phase transmission lines for which three 500-kw. transformers will be required. A 5000-kw. turbine will also be added to the equipment of the company's power house upon completion of the additional lines. Address T. J. O'Dea, superintendent.

New England

BOSTON, MASS., July 22, 1913.

Business is not so good as it was in May and June, but this is the customary July experience. The machine tool manufacturers make a wide variety of reports. Some of them continue to be very busy and others find business dull. In several instances July shows improvement over a dull June. It is perhaps significant that pessimistic discussion is heard less often. The autumn is looked forward to with great interest, in the belief that it will tell the story of the actual results of the various factors which have been bearing upon the situation.

The strike at the works of the B. F. Sturtevant Company and the Becker Milling Machine Company, Hyde Park, Mass., is still in progress. The owners are making no concessions, and continue to deal with the employees as individuals. The men are returning, a few at a time, so that the shop forces are each week nearer their normal working strength.

The B. F. Sturtevant Company, Hyde Park, Mass., announces that it will establish a Canadian plant, and that arrangements have been completed for the acquisition of the works of the Canadian Motors Company, Galt, Ontario. The installing of machinery will begin in the very near future. All Canadian work will be built or at any rate assembled there, and as time goes on, and as facilities can be increased, apparatus will be built at Galt for foreign countries, such as Australia and South Africa, and exported from Canada rather than from the United States.

The Charles G. Allen Company, Barre, Mass., builder of sensitive drilling machines, was the purchaser of the name and good-will of the H. G. Barr Company, Worcester, Mass., at the recent auction sale. The Allen company also acquired the patents, patterns, drawings and unfinished parts of the Barr drilling machine. As was stated last week the lot covered by this transaction brought $2125.

The Skinner Chuck Company, New Britain, Conn., manufacturer of lathe, drill and planer chucks, is planning to erect an additional building, the details of which have not been fully determined. However, the building will probably be about 50 x 160 ft. It is hoped that the plans and specifications will be ready to submit to contractors within the next 30 days. The details of additional equipment have not been worked out.

The Worcester Strip Steel Mills, a subsidiary of the Worcester Pressed Steel Company, Worcester, Mass., already referred to in these columns, will manufacture and sell steel in all forms but principally cold rolled and hot rolled strip steel. The directors are John W. Higgins, Arthur P. Higgins and Harry J. Williams. The business has not yet been incorporated, but later it may become a Massachusetts corporation. Two steel buildings will be erected in the fall, one 90 x 150 ft. for cold rolling, the other 40 x 120 ft. for annealing furnaces. The contracts will be placed in a few weeks. New cold rolling mills and furnaces will be purchased. Inquiries are now out, and orders will be placed in the fall. The company has been operating its cold rolling mills, annealing furnaces and pickling tanks for the past year in rented buildings at Barber's Crossing.

The Massachusetts Institute of Technology, Boston, Mass., is to establish a laboratory and bureau for electrical research, under the official name of the Division of Electrical Engineering Research. For it and the new electrical library an endowment of $110,000 is already assured. Dr. Harold Pender has been made its director. The department will be operated on a practical basis, with a permanent force of engineers.

William H. Leland & Co., Worcester, Mass., manufacturers of crank shafts and grinding machines, are planning the erection of an additional building, 84 x 178 ft., one story, with a gallery at either side of a craneboy which will be served by a 10-ton traveling crane. Another addition, for storage, will be 40x100 ft., one story and basement.

The plant of the Hartford Foundry Company, Hartford, Conn., has been closed temporarily by the receiver.

The I. C. Yale Mfg. Company, Yalesville, Conn., manufacturer of silverware, states that it will not rebuild the factory which was destroyed by fire recently.

The Whitney Manufacturing Company, Hartford, Conn., which is making extensive additions to its factory, has sold its 20-in. water tool grinder to the Taylor & Fenn Company, also of Hartford, and will now devote its entire attention to the manufacture of high grade driving chains, keys and cutters for the Woodruff system of keying, and hand (feed) milling machines.

Philadelphia

PHILADELPHIA, PA., July 21, 1913.

A little better buying, particularly in heavy machine tools, has appeared, but the market is still spotty. Sales have been in odd tools, with very little doing in groups or large lots. Railroad buying is practically at a standstill, purchases being delayed by other important matters, which include the still present probability of a trainmen's strike on the Eastern roads. New business in machinery lines develops slowly, the market exhibiting the customary quiet midsummer conditions. In some few specialties the demand continues good, but makers of special machinery are, as a rule, less actively engaged. There is a fairly good demand for moderate sized power equipment, and negotiations are also pending for several large installations in connection with building operations. Second-hand machinery is quiet. Foundry operations in some directions are diminishing, and new business is in smaller volume.

The building occupied jointly by the Alert Tool Company and several other manufacturing concerns at 221-227 North Twenty-third street was visited by fire July 16. The damage sustained by the Alert Tool Company was principally from water and smoke and will not seriously inconvenience operations or deliveries on orders. The machine tool equipment was but slightly injured.

The Wrigley Mfg. Company, maker of scouring soaps and specialties, has let a contract for the erection of a two-story addition to its plant at Wayne and Windrim avenues. Information regarding the probable mechanical requirements is not available.

The Hercules Welding & Machine Company, operating a welding, brazing and machine plant at 1422 Vine street, under a copartnership agreement, has been incorporated with a capital stock of $5000. The incorporators are the former copartners, F. B. and C. N. Beddall and A. W. Fisher. No improvements to the plant are contemplated at this time.

V. Clad & Sons, manufacturers of hotel and general cooking apparatus and supplies on Twelfth street below Locust street, have leased two floors of the C. C. Knight Building, Sixteenth and Callowhill streets, covering 40,000 sq. ft. of floor space, which they expect to occupy in about 30 days. Facilities for manufacturing will be largely increased but details will not be considered for a week or more.

The H. P. B. Electric Company has been incorporated under Delaware laws with a capital stock of

$50,000, to manufacture and deal in electrical machinery of various kinds. The incorporators named are Robert G. Hall and Maurice E. Benton, Philadelphia, and L. W. Powers, Rye, N. Y. Particulars as to the plans of the organization are not available.

The Western Ice Mfg. Company, Cardington, Pa., is taking estimates for the construction of a one-story brick addition, 31 x 124 ft., from its own plans. It is understood that the extensions will be used in connection with the engine and tank rooms.

Contractors in Baltimore, Md., are estimating on the construction of a large automobile manufacturing plant to be erected on Eastern avenue, Canton, for the Lord Baltimore Truck Company, from plans by F. C. Lawrence, engineer. The main building will be 125 x 600 ft., two stories.

Riggs, Distler & Stringer, Inc., Baltimore, Md., report the demand for power plant equipment as being quite active. Contracts have been closed for a 150-hp. engine for the Pikesville Dairy Company, a 150-hp. boiler for the Hyattsville Ice Corporation, and several boilers for canneries and contractors. This company is installing a fire line system for the Western Maryland Railroad and various heating and mechanical plants for different plants and institutions.

It is stated in the daily papers that the Novelty Steam Boiler Works, 917-929 South Howard street, Baltimore, Md., will build a one-story steel frame addition, 110 x 155 ft., for use as a crane and boiler shop, and that application for a building permit has been made.

Chicago

CHICAGO, ILL., July 21, 1913.

The Monarch Tool & Machinery Company, Chicago, has purchased from J. J. Dobes the factory property, 75 x 125 ft., at Sixteenth and Lincoln streets, the consideration being $21,000.

The Chicago Board of Education has approved the report providing for the building of a new technical high school at Normal Park. The plans suggested call for an expenditure of approximately $750,000.

The Webster Electric Company, Chicago, with shops at Racine, Wis., has modified its charter so that of its $450,000 capitalization it will be represented by $60,000 in Wisconsin. Oswald O. Wagley is in charge of the company's interests in Wisconsin.

The Metallurgic Engineering Company, Monadnock Building, Chicago, engaging in processes and equipment for treating ores, and builder of electric furnaces for the manufacture of steel, has been incorporated with a capital of $5000 by F. T. Snyder, W. A. Hatfield and M. G. Smith.

The Regensteiner Colortype Company, Jackson boulevard and Center avenue, Chicago, is having plans prepared for an addition to its plant estimated to cost in the neighborhood of $130,000.

S. D. Childs & Co., manufacturers and dealers in stationery, 136 South Clark street, Chicago, have purchased a site on West Madison street for the erection of a new factory to cost $100,000.

Bids will be received by J. Schroeter, chairman of the board, Hammond, Ind., until August 6, for a sewer system and pumping station.

The DeKalb Wagon Company, DeKalb, Ill., has increased its capital stock from $25,000 to $125,000 for the purpose of extending its manufacturing plant, etc.

A site has been purchased by the Lincoln Commercial Club for the Typhoon Signal Company's new factory at Lincoln, Ill. A brick building is to be erected, 50 x 70 ft., two stories.

The Western Patent Leather Company, Harvard, Ill., has been incorporated with a capital stock of $25,000, by Barto Chiappe, Frank L. Bockins, Joseph Bonardi, John Baimi and John Girod to equip a plant for the manufacture of patent leather.

The Chicago & Eastern Illinois Railway Company is planning improvements at Salem, Ill., to cost about $80,000.

The Swarm Mfg. Company, Hampton, Ill., has been investigating manufacturing sites at Moline with a view to moving its plant to that city. The company manufactures woven-wire fence and wire stretchers.

The Decatur Mfg. Company, Decatur, Ill., has increased its capital stock from $6000 to $40,000.

The Leonard Hi-Oven Company, Grand Rapids, Iowa, is having plans prepared for a new factory building.

The Lennox Furnace Company and the Quick Action Range Company, Marshalltown, Iowa, have purchased 27 acres of land on which a modern plant will be erected. The main factory building will be 100 x 500 ft., two stories.

The Champion Motor Car Company, recently organized for the manufacture of automobiles, has leased the plant formerly owned by J. T. Elwell, Minneapolis, Minn., and will install machinery for making six-cylinder, 50 hp., and four-cylinder, 36-hp. cars.

Plans for the erection of new shops and a roundhouse by the Northern Pacific at White Bear Lake, Minn., have been abandoned, the adverse rate decision being given as the cause.

Detroit

DETROIT, MICH., July 21, 1913.

The demand for machinery in the local market has quickened to some extent, although the business for the most part is the supplying of small miscellaneous needs of the general manufacturing trade. No buying of importance is being done by the automobile industry, but single tool orders for replacement purposes from this source are fairly numerous. Trade from up the state continues slack. Second-hand dealers report few transactions and there is little life in the market. Building operations are less active and new projects are chiefly of a minor type.

The Mexican Crude Rubber Company, Detroit, has had plans prepared for the erection of a one-story steel and frame shop, 30 x 200 ft., to cost about $11,000.

The Standard Novelty Mfg. Company, Detroit, has been incorporated with $25,000 capital stock to manufacture metal novelties.

The Joseph Mack Printing Company, Detroit, has acquired a site, 100 x 200 ft., at John R. and Elizabeth streets and will erect a five-story tile printing plant. Some new equipment will be installed.

The Buhl Land Company, Detroit, has awarded the contract for the erection of a three-story reinforced concrete factory building to the A. J. Smith Construction Company. The building will be 152 x 405 ft. and will cost $75,000. Information as to its use is not available.

The plant of the I. L. Schrinman Company, Detroit, manufacturer of wiping cloths, was damaged by fire July 16, to the extent of $30,000, a large part of which represents mechanical equipment. Operations will be resumed at once.

The Union Electro-Products Company, Detroit, has been incorporated with $25,000 capital stock to manufacture electric cooking and heating utensils. James D. and Alexander Lamont and Muir B. Duffield are the incorporators.

The Utility Compressor Company, Detroit, has been incorporated with a capital stock of $100,000 to engage in the manufacture of air compressors and other machinery. C. M. Holley and C. C. Jennings are the principal stockholders.

The War-Walt Company, Detroit, has been incorporated with $3000 capital stock by J. E. Warner, R. M. Drysdale and others to manufacture machinery.

The Detroit Operating Company, Detroit, has been incorporated with $50,000 capital stock to manufacture and deal in automatic vending machines. Paul Turner is the principal stockholder.

The Atlas Belting Company, Niles, Mich., will shortly begin the erection of a plant, 60 x 300 ft., one story. No mechanical equipment will be required at present.

The Johnson Furniture Company, Grand Rapids, Mich., is completing a new factory on a 3½ acre site. The factory is 62 x 218 ft., five stories. The equipment will be installed shortly.

The John Knape Machine Company, Grand Rapids, Mich., is building another addition to its factory, 50 x 85 ft., two stories, of reinforced concrete construction.

The Cobbs & Mitchell Company and the Cadillac Veneer Company, both located at Cadillac, Mich., have shut down pending the installation of additional machinery. New boilers will be added at both plants.

The Grand Rapids Motor Truck Company, Grand Rapids, Mich., has been adjudicated a bankrupt and on the petition of creditors the Grand Rapids Trust Company has been appointed receiver.

The United States Cashier Company, Portland, Ore., manufacturer of cash registers, etc., has acquired a large factory site in Mt. Clemens, Mich., and will at once proceed with the erection of a plant. The company will remove its entire business to Mt. Clemens.

The taxpayers of Three Rivers, Mich., have voted

$30,000 bonds for the purpose of modernizing the water pumping station and $20,000 bonds for the construction of a municipal electric lighting plant.

The Morrill & Morley Mfg. Company, Benton Harbor, Mich., manufacturer of spray pumps, will purchase a milling machine with dividing head, a universal grinder, a 20-in. turret head lathe, a pony screw machine, and a key-seating and hobbing machine.

Milwaukee

MILWAUKEE, WIS., July 21, 1913.

A review of the situation in Milwaukee and vicinity at this time shows a considerable lack of uniformity in conditions. A few shops are operating at capacity, and others at anywhere from 50 to 75 per cent. Machine tool builders lead the list of busy manufacturers, but even in this line midsummer slackness is evident. Orders are few and far apart, but inquiries for fall and winter delivery are coming in at a satisfactory rate and apparently there seems to be no cause for apprehension. Second-hand business is quiet, but there is no surplus.

The Corrugated Veneer Packing Products Company, Milwaukee, has been incorporated with $100,000 capital stock by Carl W. Baumgarten, C. M. Dering and E. B. White.

The Optenberg Iron Works, Sheboygan, Wis., is in need of additional production space and contemplates the erection of a large addition. To the absence of proper sidetrack facilities, which were promised when the company first came to Sheboygan in 1893, but never built, is due a disinclination to erect an addition, and three offers to move to other cities are under consideration. The company builds large boilers and has recently shipped several of unusual size, one going to the Wisconsin Foundry & Steel Works, Cedar Grove, Wis.

The Aluminum Castings Company, Cleveland, Ohio, is about to reopen its foundry at Manitowoc, Wis., which was closed May 1 and its bookings distributed among other branch plants in the Middle West. Continued labor difficulties and transportation troubles were given as reasons, although just previous to this time Conrad Werra, general manager of the Manitowoc plant, resigned and moved to Waukesha, Wis., where he established an aluminum foundry in company with Alex. Pankratz, who was superintendent at Manitowoc. Orders have now come from Cleveland that the Manitowoc shops be renovated and placed in condition for active operations.

John Holz, E. J. Aker and Knut Thompson of Racine, Wis., have organized the Wisconsin Cylinder Foundry Company, to establish and operate a plant for the production of automobile engine cylinders. The corporation has a capital stock of $25,000.

Ground has been broken by the Racine Foundry Company, Racine, for a large pattern shop on Washington avenue, adjoining its main plant. It is scheduled for completion and occupancy on September 1.

C. A. Hamilton, Racine, who recently resigned as vice-president of the Lavigne Gear Company, is establishing a small shop for experimentation and tests of cyclecar and cyclecar motors, in which field he is a pioneer.

The Janesville-Wisconsin Molding Sand Company, Janesville, Wis., has been incorporated with a capital stock of $25,000 by J. F. Pember, T. W. Nuzum and H. L. Maxfield, to develop rich sand beds in Rock County and market the material which is considered exceptionally well suited for foundry use.

The Badger Auto Company, Mayville, Wis., has been incorporated with a capital stock of $20,000 by Richard A. Riedebusch, Fred J. Lang and A. T. Lang, and will erect and equip a garage and machine shop and engage in the automobile business.

The Wisconsin Engineering Company, Eau Claire, has been incorporated with $60,000 capital by Fred McDonough, Jr., and Joseph C. Culver.

The Reedsburg Electric Company, Reedsburg, Wis., has been incorporated with a capital stock of $10,000 and will establish a plant for the production of small electric motors. J. R. Semple, formerly of Chicago, and James A. Stone, of Reedsburg, are the principal stockholders.

The Farmers' Implement Company, Seymour, Wis., has been incorporated with a capital stock of $30,000 by L. H. Waite, E. J. McGeehan and W. Beck to manufacture machinery.

The Plymouth Brewing Company, Plymouth, Wis., has been organized by J. E. Curtis, M. C. Mead, J. H. Goelzer and M. H. Hand to establish a brewing and malting plant.

Indianapolis

INDIANAPOLIS, IND., July 21, 1913.

James P. Goodrich, receiver, is continuing in operation the Noelke-Richards Iron Works of this city.

The Ideal Brass Works, Indianapolis, has been incorporated with $10,000 capital stock to manufacture brass, iron and steel by E. F. McCoy, E. M. McAdams and D. L. Stone.

The Capital City Welding Company, Indianapolis, has been dissolved.

The Huntington Machine & Foundry Company, Huntington, Ind., has increased its capital stock from $125,000 to $140,000.

The Rock City Mfg. Company, Wabash, Ind., has been incorporated with $15,000 capital stock, to manufacture screen door hinges, by B. A. Houser, George Barcus and C. E. Smith.

Jacob D. Miltenberger has been appointed receiver for the Muncie Iron & Metal Company, Muncie, Ind.

The Specialty Mfg. Company, Greenfield, Ind., manufacturer of cheese knives and similar articles, will move its plant to Indianapolis.

The Blackford paper mill, Hartford, Ind., was destroyed by fire, July 9, entailing a loss of $50,000.

The Thompson Bottle Company, Gas City, Ind., suffered a loss by fire of from $100,000 to $150,000. It is believed that the plant will be rebuilt this summer.

Cleveland

CLEVELAND, OHIO, July 22, 1913.

Dealers report a fairly satisfactory volume of scattering orders, which are mostly for small-sized single tools. Considerable business in fair-sized lots of tools in prospect is being held up. Two large Ohio manufacturing concerns are planning the erection of extensions that are expected to require considerable machinery. Railroads are doing some buying, but orders from this source are almost entirely for single tools. The demand for electrical equipment is fairly good, having improved recently. Business continues good in the gray-iron foundry trade.

The American Steel & Wire Company has the following list out for machinery requirements for its Cuyahoga plant, Cleveland:

One 24-in. shaper.
One 14-in. shaper.
One 36-in. band saw.
One universal grinding machine, swing 17 x 48-in. between centers.
One 6-in. cold saw.
One arbor press.
One heavy pinion cutting machine, capacity to cut gears up to 36-in. diameter.
One 30-in. x 10-ft. planer.
One 20-in. drill press, including ¾-hp. motor.
One 32-in. lathe, swing 10 ft. between centers, with tapir attachment and motor.
One 72-in. boring mill.
One single cylinder surfacer, including jointing and setting attachment.
One 4-ft. high duty plain radial drill.
One 16 x 72-in. plain self-contained roll grinding machine.
One 24-in. sliding head drill press.
One ball bearing sensitive drill press.
One 24-in. x 12-ft. motor driven engine lathe with 22-in., 4-jaw chuck, including motor.
One hollow hexagon turret lathe with both bar and chucking equipment, motor driven.
All of the above machines are to be motor driven except the surfacer and roll grinding machine, which are to be belt driven.

The Cleveland City Forge & Iron Company, Cleveland, will shortly make some plant improvements which will include the installation of a monorail system and the erection of a building, 100 x 120 ft., which will be used for the shipping department. Plans for this work have been prepared by the J. W. Frazier Company, Rockefeller Building, Cleveland, which will receive bids.

The Standard Motor Truck Company, 2352 Euclid avenue, Cleveland, expects shortly to acquire a site for the erection of a new plant.

The J. W. Frazier Company, Cleveland, is doing the engineering work in connection with the erection of a 240-ft. bridge to be erected by the Pennsylvania Coal & Dock Company, Milwaukee, Wis., to replace one that was blown down a few weeks ago.

The Crane Fence Company, Cleveland, has been incorporated with a capital stock of $1000 to manufacture wire fencing and to do electric galvanizing.

The Commercial Auto Body & Mfg. Company, Cleveland, has established a plant in the building at 5345 St. Clair avenue, formerly occupied by the American Railway Signal Company. The plant includes a woodworking shop, tinshop, metal-working shop and blacksmith shop. A machine shop will be provided a

little later and some machine-tool equipment will be required. The company will make bodies, fenders and other automobile parts. F. L. Fuller is president; M. P. Larson, vice-president and general manager, and L. S. Fuller secretary and treasurer.

The Allen Motor Car Company, Fostoria, Ohio, has placed contracts for the erection of a one-story brick and concrete manufacturing plant, 98 x 198 ft.

The Wise Furnace Company, Akron, Ohio, has additions to its plants well under way. These include a four-story building, 50 x 175 ft., to be used for a machine shop and for sheet-metal work, and two warehouses, one 50 x 100 ft., two stories and the other 100 x 160 ft., one story.

The National Motor Truck & Mfg. Company, Gibsonburg, has been incorporated with a capital stock of $250,000 to manufacture automobiles and motor vehicles. E. C. Rassell, C. H. Hutchinson, A. T. Crosset and others are incorporators.

The Arctic Cold Storage & Ice Company, Akron, Ohio, is planning the erection of a six-story concrete cold storage and ice plant. The company is opening temporary offices at 403 First & Second National Bank Building, Akron.

F. B. Zeig and R. Y. Struble have purchased the J. B. Foote foundry, Fredericktown, Ohio. The molding department, which was burned recently, will be rebuilt and the plant enlarged. The foundry will be under the management of F. B. Zeig, who is the proprietor of the Zeig foundry in the same place. The two foundries will be operated as separate industries.

The Akron Gear & Engineering Company, Akron, Ohio, has increased its capitalization from $20,000 to $50,000.

The National Supply Company, Toledo, Ohio, is planning a large addition to its foundry, woodworking and machine shops.

The Wheeling & Lake Erie Railroad is planning the erection of a roundhouse and machine shop in Zanesville, Ohio.

The Zicer Company, Cleveland, has been incorporated with a capital stock of $50,000 to manufacture and deal in refrigerating apparatus, ice-making machines, etc. F. K. Studor, S. W. Sharp and others are the incorporators.

The Shelby Foundry Company, Shelby, Ohio, was destroyed by fire July 17, the loss being estimated at about $50,000.

The Central South

LOUISVILLE, KY., July 22, 1913.

Machinery manufacturers, the boiler men especially, are talking more optimistically than they have for a long time. They are getting plenty of orders, and report that prospects are decidedly good. One local plant, which a few months ago was looking forward to working only part of its force, reported that it had been unable to give its men Saturday afternoons off, as it usually does during the summer, on account of the heavy run of business, and that the amount of trade booked is larger than at any time since 1906. Another feature of the situation is that manufacturers of power equipment are finding so much business right at their doors that they have been able to keep going without looking for trade a long distance away, the territory within 150 miles of Louisville having been prolific almost as never before. The intensely hot weather has stimulated the demand for ice machinery, despite the fact of its being rather late in the season for installations to be used this year, and makers of this class of equipment are finding trade unusually good. Many manufacturing plants are planning improvements and enlargements, and this of course is making the demand for special equipment of all kinds good. Woodworking equipment especially is in good demand.

The American Oak Leather Company is considering the use of electricity in its Louisville plant, involving the installation of a generator, motors, etc. The improvement has not been finally decided upon. B. M. Henry is manager.

The J. V. Pilcher Mfg. Company, Louisville, has completed plans for the addition to its metal-working factory, and the contract for the buildings will be let at once.

The Ohio River Sand Company, Louisville, has let a contract for the construction of some large reinforced concrete sand bins at Thirtieth street and Broadway, and will require some conveying equipment for them.

Roberts & Conner, New Albany, Ind., who as recently announced will build a new mill at Newport, Ark., state that they are in the market for a rotary machine for veneer manufacture. The dimension required is 60 or 66 in. A 16-ft. veneer saw is also wanted. Second-hand equipment will be considered.

The Electric Light & Power Company, Princeton, Ky., which recently announced plans for the construction of a new plant, has the buildings well under way and will be ready for the installation of equipment in the near future. W. J. Holman is general manager.

The plant of the Selby Shoe Company, of Portsmouth, Ohio, at Ashland, Ky., is to be enlarged, according to an announcement of P. E. Selby, an officer of the company.

Richard and Charles Thomas, Ashland, Ky., have decided on the construction and equipment of a large steam laundry. The building will be 36 x 100 ft.

The city of Harrodsburg, Ky., is considering the installation of alternating current equipment in its electric light plant at a cost of $10,000.

The Growers' Warehouse Company, Flemingsburg, Ky., has announced that work on its new building will be begun at once. It will be 184 x 192 ft., and will require power machinery, presses and other equipment.

A company is being organized at Mount Sterling, Ky., for the purpose of establishing an ice factory.

The cooper shop of W. R. Stout & Sons, Owensboro, Ky., was burned recently with $5000 loss. Plans for rebuilding are now being considered.

The Wood Auto & Machine Company, Carrollton, Ky., has been incorporated with $10,000 capital stock by E. A. Wood, P. Monnyhan and E. C. Smith, and will equip an automobile repair shop.

The Danville Ice & Coal Company, Danville, Ky., has announced plans for the installation of power-driven coal handling equipment at an estimated cost of $8000.

The city of Henderson, Ky., will install a pump in the electric light plant for the purpose of drawing water from the Ohio River. Address Superintendent Hite for details.

Cadiz, the county seat of Trigg County, Ky., plans to have an electric light system completed by this fall. Address A. P. White & Co., or George L. Smith, Cadiz, Ky.

The Mayhew Milling Company, Owensboro, Ky., has been incorporated with $10,000 capital stock for the purpose of establishing a chain of small flour mills of the midget type at various points in western Kentucky. Mark Mayhew is the head of the company. Others interested are Freeman Little, Charles A. Rogers and W. L. Reno.

The Norfolk & Western Railroad, it is reported, will erect an ice plant, to be located at either Portsmouth, Ohio, or Kenova, W. Va. A recent shortage of ice for its own use is given as the reason for the decision to build a plant.

R. C. Aycock, South Pittsburg, Tenn., has disposed of his hosiery mill, and will erect another plant after January 1. He will continue in charge at South Pittsburg until that time.

The Century Company, Chattanooga, Tenn., has been incorporated with $250,000 capital stock to erect a 12-story office building at Eighth and Market streets. Work will begin early in 1914. John A. Patten, W. E. Brock and Francis Martin are among those interested.

The Henson Cottonseed Oil Mills, Ninth and Broad streets, Chattanooga, Tenn., is in the market for a lathe with 20 to 24 in. swing, 10 ft. between centers. The company states it can use a second-hand machine, if it is modern in design and in first class order.

The city of Knoxville, Tenn., has decided on the expenditure of $35,000 for the purpose of improving the municipal water plant. Address the board of commissioners.

The Southern Excelsior Company, Nashville, Tenn., suffered the loss of its plant July 14 by fire, the loss being about $5000. H. J. Tample, the owner, will probably rebuild.

The Ragland-Baxter-Morford Company, Nashville, Tenn., has taken over the plant of the E. & N. Mfg. Company, a large woodworking concern, and plans to enlarge it to a considerable extent. Charles M. Morford is president.

Definite announcement has been made by the Nashville Roller Mills, Nashville, Tenn., of plans for the reconstruction of its plant, which was recently destroyed by fire. Vernon S. Tupper is general manager, and may be addressed for details as to machinery requirements.

The American Bakeries Corporation, Chattanooga, Tenn., is constructing a $25,000 plant, and plans the erection of similar establishments in Atlanta, Ga., Birmingham, Ala., and Jacksonville, Fla.

The Mountain City Milling Company, Chattanooga, Tenn., is completing the construction of a large reinforced concrete grain elevator, and will be ready for machinery installations a little later on.

Cincinnati

CINCINNATI, OHIO, July 22, 1913.

The unrest in labor circles causes some hesitation in local plans for plant additions. The molders' strike is not yet settled, and both sides are simply playing a waiting game. Should the strike continue for any length of time, it will doubtless affect the majority of the machine tool plants here, and in some instances will cause shutdowns. Already, several plants have been compelled to lay off a number of mechanics. As business is rather slow just now, this has not yet proved a hardship to any of the local manufacturing firms, and as the majority of them have a stock of rough castings on hand, they will not be hampered on this score in operations for some time to come.

Second-hand machinery dealers, who make a practice of reaching out after business in the South, state that there was generally a much better report last week from their different representatives, and that orders were also more plentiful, although general conditions in this particular line of the trade are not yet satisfactory.

The Ohio Knife Company's new factory on McLean avenue, Cincinatti, will soon be ready for occupancy. As was recently announced, nearly all the necessary equipment has been purchased.

The Columbia Gas & Electric Company, Cincinnati, has commissioned Sargent & Lundy, Chicago, Ill., to draw up plans for a generating station to be erected on Front street. Mention of this same project was recently made under the name of the Union Gas & Electric Company, a subsidiary.

The George C. Miller Sons Carriage Company, Cincinnati, has let the contract for remodeling and enlarging its plant. Little additional equipment will be required.

The Bahmann Iron Works Company, Cincinnati, manufacturer of sugar machinery, has taken a 25-year lease on the factory it now occupies. No additions are planned at the present time.

B. Sicking, 1718 Freeman avenue, Cincinnati, has let contract for a one-story repair and machine shop to be 20 x 55 ft., and of brick construction.

Part of the plant of the Charles Boldt Glass Company, Cincinnati, was destroyed by fire July 20. The damage is estimated around $25,000. Rebuilding plans are already under way, and considerable special equipment will be required.

The addition to the plant of the Corcoran Lamp Company, Cincinnati, recently mentioned as contemplated, will be 35 x 60 ft., one story and of regular mill construction. B. L. Baldwin & Co., Perin Building, Cincinnati, drew up the plans for the new structure.

The Procter & Gamble Company, Cincinnati, soap manufacturer, has let the contract for an addition to its plant at Ivorydale, a suburb, to be 160 x 190 ft., three stories and of concrete construction. Equipment details have not been given out.

The Crucible Steel Company of America has let contract for a warehouse and office building to be erected at Third and Elm streets, Cincinnati. The proposed structure will be 40 x 100 ft., two stories.

The H. L. Brown Fence & Mfg. Company, Oakley-Cincinnati, Ohio, has increased its capital stock from $15,000 to $50,000. The increase was made to take care of improvements already made, and no additions to its plant are now contemplated.

The Cincinnati Refrigerating Company, Hamilton, Ohio, has completed its 150-ton refrigerating plant. The ammonia compressors are driven by a Hamilton Corliss engine, built by the Hooven, Owens & Rentchler Company.

The Urlandt Gas Generating Mfg. Company, Columbus, Ohio, has been incorporated with $100,000 capital stock. The incorporators are D. N. Hyman, Oswell C. Phillips, H. D. Sheppard, Arthur Uhrlandt and S. O. Esswein. Nothing is known as to manufacturing plans.

The Niles Tool Works Company, Hamilton, Ohio, announces that its new brick pattern storage building, 56 x 250 ft., is practically completed and will be in use soon. This building takes the place of a frame structure destroyed by the recent floods.

A large plant for the manufacture of various cement products will be built at Sidney, Ohio, by the Sidney Cement Company, of which Bailey DeWeese is the manager.

The National Motor Truck & Mfg. Company, Gibsonburg, Ohio, has been incorporated with $250,000 capital stock, by E. C. Rassell and others. Nothing has yet been given out as to manufacturing plans.

The municipality of Bexley, Ohio, is asking for bids on equipment for a small waterworks plant. Details may be obtained from George E. Fry, city clerk.

It has been announced that the Barney & Smith Company, Dayton, Ohio, recently placed in the hands of a receiver, will remodel part of its plant for the manufacture of steel cars. The receivers have been authorized to expend $175,000 to adapt the plant for this particular work.

Samuel Hannaford & Sons, Cincinnati, have drawn up plans for a machine shop addition to the plant of the American Pad & Textile Company, Chillicothe, Ohio.

H. Seagraves is the principal incorporator of the Seagraves Machine Company, Pikesville, Ohio. The company is capitalized at $6000.

It is rumored that the Ohio Galvanizing & Mfg. Company, Niles, Ohio, contemplates moving its plant to Middletown, Ohio, or establishing a branch in that city.

Bids will be received until July 30, by the Building Commission, Marysville, Ohio, for a power plant at the reformatory.

St. Louis

ST. LOUIS, MO., July 21, 1913.

The machine tool interests are pinning their attention more to the crop conditions than anything else and as these are favorable for this territory a fairly satisfactory frame of mind exists. Inquiries are reasonably good for the season and the aggregate is running up quite well, though no large lists are coming out. Replacement equipment, single tools and some second-hand machinery constitute the run of business. Collections are satisfactory.

The St. Louis Screw Company, St. Louis, Mo., has increased its capital stock from $200,000 to $500,000 and has also provided for a bond issue of $300,000 in pursuance of its plans for enlarging the plant as contemplated when the recently reported purchase of a site for a new group of structures was made.

The Oliver Machinery Company has been awarded the contract for supplying the equipment needed for the manual training departments of the St. Louis public schools for the coming year.

The Eagle Iron Works Company, St. Louis, Mo., has been incorporated with $10,000 capital stock by Erich E., Edward A. Gesine and Louis D. De Vries, of Ames, Iowa, to manufacture iron and steel products.

The Valco Mfg. Company, St. Louis, Mo., has been incorporated with $15,000 capital stock by Harry A. Adams, Frank J. Bonskowski and James L. Hopkins to manufacture machinery, tools, etc.

The Metallic Shoe Findings Company, St. Louis, Mo., has been incorporated with $10,000 capital stock by W. L. Duncan, Gus and Joseph Buselaki, Russell J. Flannery, William Skinner and others to manufacture shoe findings made of metal.

The Amazon Rubber Company, St. Louis, Mo., is completing a building which will be equipped with machinery at once for the manufacture of rubberized cloth. The company is capitalized at $100,000. W. H., E. F. and H. F. Schewe are interested.

The Inland Machine Works, St. Louis, Mo., has been incorporated with a capital stock of $18,000 by John and Peter J. Flammang and Philip Schwarz to manufacture machinery, tools, dies and metal and wooden products.

The Burhen Utilities Mfg. Company, St. Louis, Mo., has been incorporated with a capital stock of $50,000 by Reinhart J. and M. W. Burhen, of Valley Park, Mo., Frank J. Laturnus of St. Louis, and others to engage in general manufacturing, including screens, screen doors and other household utilities, chiefly of wood and metal.

The Murphy Door Bed Company, St. Louis, Mo., has been incorporated with a capital stock of $10,000 by H. C. and S. N. Martin, H. F. and G. E. Noble and W. E. Apt to manufacture metal beds, etc.

The American Syrup & Preserving Company, with headquarters at Nashville, Tenn., has bought a factory site in St. Louis and will equip a large plant for a general canning and preserving business, including steam and power plant.

The contract of the city of St. Louis for the construction and equipment of its new water works intake tower, etc., to cost about $500,000, has been awarded

to the Fruin-Colnon Contracting Company, which will begin the work at once.

The Western Foundry & Sash Company, St. Louis, Mo., has filed notice of an increase in its capital stock from $10,000 to $35,000.

The Missouri Engine Company, recently organized to take over the Lipper Engine Company, St. Louis, has started work on a two-story addition to its plant, to cost $4500.

W. H. Cocke, president of the Commercial Acid Company, East St. Louis, Ill., announces plans of the company to enlarge its plant at an expenditure of $30,000. Among the new equipment to be installed is an ore roasting furnace for the manufacture of sulphuric acid.

The Medart Patent Pulley Company, St. Louis, calls attention to an error made in *The Iron Age* of July 3 in the statement that its plant was destroyed by fire. The plant damaged was that of the Medart Mfg. Company, which has no connection whatever with the Medart Patent Pulley Company. The damaged building of the Medart Mfg. Company has been repaired, and the company is about ready to move into it again.

The Schram Glass Mfg. Company, St. Louis, which will build a large plant at Sapulpa, Okla., will require conveyors, batch mixers, etc., besides special glass-making machinery.

The Clover Leaf Milling Company, Buffalo, N. Y., has bought a site at East St. Louis, Ill., and will equip a mill at a cost of about $90,000 for building and machinery, chiefly the latter. It will manufacture alfalfa feed products.

The General Roofing Company, East St. Louis, Ill., will enlarge its plant and increase its equipment at an expenditure of about $50,000.

The Swift Produce Company, Springfield, Mo., will erect a packing plant to cost $150,000.

The Novelty & Foundry Company, Macon, Mo., has been incorporated with a capital stock of $25,000 by A. B. Miller, I. A. Cole and E. E. Brock to engage in general foundry and manufacturing business.

The Shale Hill Brick & Tile Company, Chillicothe, Mo., has been incorporated with a capital stock of $200,000 by B. J. Meek, C. F. Adams and William A. Summerville to engage in manufacturing brick and tile.

The Waters-Pierce Oil Company's plant at Springfield, Mo., was burned July 17 with a loss of about $50,000. Considerable pumping equipment was destroyed and will be replaced.

The Imperial Mfg. Company, Kansas City, Mo., has been incorporated with a capital stock of $20,000 by Jacob Rothschild, L. E. Stein and Sigmund Stein, to engage in general manufacturing.

The Sportsman's Cartridge Company, Kansas City, Mo., has been incorporated with $100,000 capital stock by H. E. and Louis A. Sherman and W. B. Williams to equip a plant for the manufacture and loading of cartridges.

The state capitol commissioners at Jefferson City, Mo., are preparing to ask for bids for a power house to cost, including equipment, about $100,000.

The city of Neck, Mo., has granted a franchise to a company represented by A. H. Baird, of Cartersville, Mo., for an electric light system to cost $25,000.

The Homestead Fence Company, Hannibal, Mo., has been incorporated with a capital stock of $20,000 by Jasper Butler, W. B. Arnold and J. J. Bowles to manufacture metal fencing.

The Oak Orchard Mining Company, 521 Main street, Joplin, Mo., is in the market for equipment for its property. The company was recently incorporated with a capital stock of $20,000.

The Colonel Mack Mining Company, Joplin, Mo., recently incorporated with $80,000 capital stock by W. E. Brinkerhoof, A. M. Tebbits and others, is in the market for equipment for a 300-ton concentrating plant, power equipment, etc.

A. F. Dexter & Co., Joplin, Mo., will equip a 200-ton concentrating mill on their mining property in the vicinity.

A cotton gin is to be erected at Carlisle, Ark., by Raborn Brothers, it is stated.

The Garland Gin Company, Garland, Ark., has been incorporated with a capital stock of $10,000 by Enoch W. Frost, W. B. Booker, E. J. Wilson and others to build and equip a cotton gin.

The Hermitage Gin Company, Hermitage, Ark., has been incorporated with a capital stock of $15,000 by L. W. Baker, I. B. Roddy and J. W. Clower to equip a cotton ginning plant.

The city of Little Rock, Ark., under the leadership of the mayor, has taken up the matter of a waterworks plant to supply Little Rock, Argenta and Pulaski Heights, Ark., the cost to be about $5,000,000.

W. B. Crossland, of Newport, Ark., has obtained a franchise for the equipment at Mena, Ark., of an electric light and power plant at a cost of $25,000 or more.

The Tombigbee Cotton Mills, Columbus, Miss., has plans for the addition of 60 automatic looms to its plant and will make other improvements.

The Odom Lumber Company, Ellisville, Miss., suffered the destruction by fire of its sawmill recently. The loss was $15,000. Plans for rebuilding will be taken up at once.

Leflore County, Miss., the officers of which are located at Greenwood, Miss., has made $150,000 available for road construction, and machinery is being sought for the work to be done under the supervision of the authorities. Bids will be opened August 4.

Usher Bros. have plans for the equipment of a hardwood sawmill at Meridian, Miss., to cost about $25,000.

The mayor of Ackerman, Miss., is reported in the market for an electric motor pump. Bids will be opened August 1.

Everybody's Gin Company, recently reported incorporated at Marlow, Okla., is in the market for the necessary equipment for a $5000 plant. R. F. Dempsey and J. F. Short are interested.

The Wetumka Gin Company, Wetumka, Okla., has been incorporated with a capital stock of $8000, by J. F. Lucas, M. L. Kitchens, E. D. Hall and others and will equip a cotton ginning plant.

The Schulter Coal Mining Company, Tulsa, Okla., recently incorporated with $100,000 capital stock, is in the market for the necessary equipment for handling an output of 500 tons daily. Coke ovens are also to be installed. Mining machinery bids will be opened about August 1.

The McAlester Saddlery Company, McAlester, Okla., will establish a factory for the manufacture of saddles and harness. John A. Harrison, W. H. Sharer and J. A. Budroe are the principal stockholders.

E. W. Wales & Co., Oklahoma City, Okla., will build at once a flour, feed and cornmeal mill and elevator to cost about $16,000.

The Muskogee Well Drilling Mfg. Company, Muskogee, Okla., recently reported incorporated, will at once equip a plant for the manufacture of water and oil drilling machinery, having acquired a site for the buildings.

The Idabel Cotton Mill Company has been incorporated with a capital stock of $50,000 at Idabel, Okla., by Walter L. Neidemeier, G. E. Dean and others.

The Oklahoma Gin, at Durant, Okla., was damaged $15,000 by fire recently. It will be replaced. The Clayton Anderson Cotton Company, Oklahoma City, Okla., is the owner.

The Morton Butler Lumber Company, of Maryville, Tenn., plans the construtcion of a mill with 100,000-ft. daily capacity. John Clerk is in charge.

The Clark Harvey Packing Company, New Orleans, La., has been incorporated with a capital stock of $25,000 by Louis and Emile Harvey and P. H. Clark.

A rice mill with a capacity of 200 barrels daily is to be equipped at Lake Arthur, La., by E. P. Fox, of Jennings, La., and C. E. Laughlin, of Lake Arthur.

T. L. McKinnon, South Winsboro, La., will build a sawmill, having purchased 1200 acres of hardwood timber.

Birmingham

BIRMINGHAM, ALA., July 19, 1913.

A continuance of a normal business for this season of the year, with an especially good outlook for the autumn, characterizes the machinery and machine tool market. Mines, mills and foundries are working on good time and many new industries are being established. The demand from the mines is excellent, there being none idle, while many are installing extensive improvements in the way of electrical machinery.

The John Flannagan Buggy Company, Birmingham, will erect a mill construction addition to cost about $15,000. The company will install electrically-driven machinery.

The Mobile Steel Company, Mobile, Ala., has been chartered with a capital stock of $25,000, to fabricate iron and steel. Walter E. Voight, New York; A. C. Krenicke, Madison, Wis., and H. M. Evans, Mobile, are the incorporators.

The Huntsville Foundry & Machine Works, Huntsville, Ala., will enlarge its plant and scope of operations. The company has been incorporated with a capital stock of $50,000. C. M. Grace is treasurer and superintendent of construction work.

The Lindsey Lumber Company will rebuild the sawmill and dry kiln recently burned at Pollard, Ala. It was insured for $27,000.

The Downing Industrial School at Brewton, Ala., contemplates the installation of an electric power and lighting plant at a cost of $50,000.

The city of Austell, Ga., contemplates the early issue of bonds for waterworks purposes. Address the mayor.

The city of Lavonia, Ga., will hold an election August 23 upon the issuance of $40,000 of bonds for constructing a waterworks system.

The Sox Duplex Cinder Deflector Company, Atlanta, Ga., contemplates establishing a factory for manufacturing a patented device for keeping cinders out of railroad cars. Henry Schaul is president.

The city of Savannah, Ga., will shortly sign a contract with the Destructor Company, New York, for the erection of a 125-ton incinerator.

Additional equipment will be installed in the electric lighting plant at Adel, Ga. F. R. Sutton is superintendent.

The J. B. McCrary Company, Atlanta, has plans for electric lighting systems in Bessemer City, N. C.; Rebecca, Ga.; Stone Mountain, Ga.; Titusville, Fla.; Walhalla, S. C.; and Westminster, N. C.

The Standard Clay Company, Macon, Ga., has been incorporated with a capital stock of $25,000. It will manufacture kaolin products. C. C. and A. L. Williams are the incorporators.

The Alabama Chemical Company will erect a $100,000 fertilizer factory at Dawson, Ga. John S. Lowery is general manager.

The W. H. Sawyer Sons Company will increase the capacity of its foundry at Americus, Ga. W. S. Ivey is general manager.

The saw and planing mills of the Gulf Lumber Company at Santa Rosa, Fla., were burned; also a $50,000 warehouse.

Robert Jackson and associates contemplate the erection of an ice plant at Mayport, Fla.

Lake City, Fla., has voted a $7500 bond issue for establishing an electric lighting system. J. C. Young is commissioner of public works.

Texas

AUSTIN, TEXAS, July 19, 1913.

Cotton picking has begun in southern Texas, and money from the crop will soon begin pouring in. With a prospective yield of more than 5,000,000 bales, it is expected to sell for upward of $300,000,000. All lines of business in the State will be greatly benefited. The tool and machinery trade is unusually good for this time of the year.

The Farmers' Co-operative Gin Company will erect a cotton gin at Farmersville. J. F. Lovell is interested.

A fruit canning and fig preserving plant is being erected at La Porte at a cost of $50,000.

The Brown County Farmers' Union is erecting a cotton gin at Brownwood.

The City Council of Luling is negotiating for the purchase of the local electric light plant and waterworks system which are now owned by private parties. If the transaction is made the plants will be enlarged and improved.

The Continental Gin Company will erect a cotton gin at Velasco.

The Dallas Southwestern Traction Company has been organized, with principal office at Dallas, for the purpose of constructing an electric railroad from Dallas to Glen Rose, via Cleburne, 80 miles, and a branch line from Eagle Ford to Irvin, 10 miles. The company has a capital stock of $500,000. E. P. Turner, B. B. Cain, John T. Witt, and E. L. Sargent, of Dallas, are among the principal stockholders. The same interests are organizing the Dallas Northwestern Traction Company which is preparing to construct an electric railroad from Dallas to Krum, via Denton, about 46 miles. The surveys for the proposed lines are nearly finished and financial arrangements for their construction are said to have been made.

Walter D. Beuhring will erect a factory at El Paso for extracting fiber and other products from the cactus plant.

The broom factory of the Rio Grande Broom Company at El Paso, which was recently destroyed by fire, will be rebuilt. W. A. Edwards is manager.

Bonds in the sum of $22,500 have been voted at Waxahachie for enlarging and improving the waterworks plant and distributing system.

Daniel Hewitt, of Cleburne, who was recently granted a franchise for an electric street railroad system at Tyler, has begun the construction of the line, which will embrace seven miles of track. The citizens of Tyler donated a bonus of $30,000 in aid of the project.

The Union Terminal Railway Company is preparing to raze a number of large buildings at Dallas, having an aggregate value of about $1,000,000, located on the property which it has purchased as a site for the proposed new union station and terminals. The board of directors of the company has authorized the issuance of $5,000,000 of bonds for the proposed improvements.

The City Commission of Dallas has selected a site for the proposed municipal sewage disposal plant. It embraces 100 acres of land and is situated four miles out. The collecting wells and pumping station will be situated near the foot of Cadiz street. The outfall or trunk line sewer which will lead to the disposal plant will be built of brick or concrete. It will be of a size large enough to care for a city of 400,000.

The Lodwick Lumber Company will erect a lumber mill at Carnack. It will have a daily capacity of 60,000 ft.

The Southern Pacific Company has purchased additional ground at Galveston for the purpose of enlarging its terminal facilities. It is planned to expend more than $750,000 on the improvements.

The Whittlesey Garage & Machine Company has erected a new garage and machine shop at San Benito.

The Farmers' Union is erecting a cotton gin at Bangs.

Robert Lynn and associates will enlarge and improve their waterworks plant and distributing system at Winkelman, Ariz.

John M. Kane and associates will construct a shipyard and drydocks at Galveston.

Steps have been taken at Waco by a number of large consumers of fuel to organize a company for the purpose of piping natural gas to that city from the Mexia gas field. It is planned to expend about $400,000 in the project.

Additional machinery is being installed in the Yorktown Oil Mill at Yorktown and its capacity doubled.

The Fort Worth Power & Light Company has filed an amendment to its charter in the secretary of state's office increasing its capital stock from $3,560,000 to $3,860,000. It will make improvements to its plant at Fort Worth.

The Farmers' Gin & Mill Company will erect a cotton gin at Sweet Home. Frank Quoto is interested.

The Farmers' Gin Company will erect a cotton gin at McKinney. A. L. Coie is interested.

The Colton Hardware Company will erect a sheet-metal factory at Casa Grande, Ariz.

The Pacific Coast

SAN FRANCISCO, July 17, 1913.

Little improvement is noted in general conditions, but the last week has brought a few more orders for machine tools than the previous fortnight, and there is plenty of business waiting for the expected readjustment in tariff and financial matters. Local merchants report quite a number of good sized single tools sold to local and outside shops. Some of the larger shops in the interior are buying a few tools and figuring on a good many more. Expected railroad orders have not come through, but some tools have been purchased for the Mare Island Navy Yard, and local dealers and agents expect to get their share of the large list for the navy repair ship.

The agent for an important line of woodworking machinery reports a very satisfactory year thus far, but says business has lately dropped off, and that now a great many important sales are temporarily held up. He believes that most, if not all of them, will be consummated as soon as the tariff bill is passed.

Conditions in other lines, with the exception of pumps, are about the same as above indicated, as money for new equipment is not readily available, and some machinery dealers who ordinarily offer easy terms insist on large cash payments. Even in some lines of fruit-handling machinery there is less activity than usual, most of the funds available being needed for irrigating equipment. Several new inquiries are out for road-building machinery.

J. P. Ford is having plans drawn for a machine shop to be built at Second and Natoma streets, San Francisco.

The Pacific Bone, Coal & Fertilizing Company's factory at San Francisco was destroyed by fire July 10 with a loss estimated at $100,000.

The local office of the Orenstein-Arthur Koppel Company has taken a Government order for 32 special cars for the San Diego coaling station. This gives the station an outfit of 50 cars of similar pattern, with a complete installation of portable track.

Harron, Rickard & McCone, San Francisco, report the sale of a No. 4 Cincinnati high-power universal milling machine, a No. 3 Cincinnati plain cone type milling machine, a 10 x 18 Lodge & Shipley 5-step lathe, a 16-in. crank shaper and a 13 x 21 Willard gap lathe.

Toulouse & Delorieux, San Francisco, manufacturers of special wine and oil machinery, report great activity in general winery equipment in preparation for the coming vintage.

A large amount of machinery, including marine engines, pumps, etc., will be required for the Associated Oil Company's new tank steamer, which will be built by the Union Iron Works.

E. L. Stanfield, of Los Angeles, has bought out the Central Garage & Machine Works, Barstow, Cal., formerly owned by J. T. Evans.

It is reported that the Homer Motors Company will build a new gas engine factory at Los Angeles.

The Southern California Edison Company has taken out a building permit for the first unit of its plant on the west side of the harbor at Long Beach, Cal.

The Sacramento Timber & Box Company is building a large sawmill in El Dorado County, Cal., and a box factory near Sacramento.

The Los Angeles Harbor Commission has recommended the purchase by the city of a dredge and other equipment for harbor development.

It is announced that a large amount of equipment will be required by the Santa Fé Railroad for terminals at Los Angeles and San Diego. Machine and car repair shops, a power and pumping plant, and a large round house will be built near Redondo Junction, and a large water front tract has been purchased for proposed improvements at San Diego.

Work has been started on a new plant for the Pacific Iron Mfg. Company on the Dominguez harbor tract near Long Beach, Cal. The company, recently organized with a capital stock of $75,000, will manufacture iron utensils, electrical specialties, etc.

The Hammond Lumber Company has secured a permit to build a machine shop at its yards on Terminal Island, Los Angeles Harbor.

The Baker Iron Works, Los Angeles, has the machinery contract for the Southern Counties Gas Company's plant at Monrovia, Cal., amounting to about $80,000.

Eastern Canada

TORONTO, July 19, 1913.

The Campbell Flour Mills, Toronto, is proceeding as rapidly as possible with the 1,000-barrel addition to its plant. This addition will make it one of the largest mills in the province.

L. Maclean, who operates a flooring and roofing manufacturing plant in Montreal, will erect a plant at Ottawa, Ont.

The Maritime Nail Company, St. John, N. B., will shortly begin the construction of its large branch plant at Fort William. Ont. The company expects to be operating early next year.

The subscription rights for the new $800,000 issue of capital stock of the Ottawa Light, Heat & Power Company expired on Tuesday. This will increase the capital stock of the company to $2,800,000, and the extra capital is to be used to cover the cost of a new $500,000 gas plant at Ottawa, Ont., and several improvements and alterations in the present gas and electric system controlled by the company.

The by-law providing for a loan to the Preston Chair Company was passed by the ratepayers of Preston, Ont.

The ratepayers of Wallaceburg, Ont., passed a by-law providing for the expenditure of $130,000 for the construction of a waterworks and sewerage system.

The ratepayers of Waterloo, Ont., passed a by-law providing for the loan of $10,000 for 10 years to Dantzer & Montag for the building of a new factory.

The Clay Products Company, recently incorporated, proposes to erect a plant for the manufacture of brick, tile, etc.

The International Steel Corporation, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by D. A. MacRae, T. W. Lawson, and others.

Construction for the first section of the enlarged Welland Canal has been provided for, the government having accepted the offer of the Dominion Dredging Company, Ottawa, Ont., to build it for $3,500,000. This offer provided for the first few miles from the Lake Ontario end. Tenders for other sections of the canal, which is to have a depth of 34 ft., will be called for shortly. The canal, when completed, will allow the largest Lake boats to reach the St. Lawrence with full grain cargoes.

It is understood that the Carter Milling Company, St. Mary's, Ont., contemplates erecting a new mill adjoining the present elevator.

Plans have been prepared by the Brantford Cordage Company, Brantford, Ont., for the erection of a large extension to its factory. The addition of 100 new spinners will increase the capacity of the plant 75 per cent. A rope factory may be built in the near future.

The by-law submitted to the ratepayers of Orangeville, Ont., to grant a loan or a bonus of $30,000 to John N. Dodds, of Alton, Ont., to encourage him to start a knitting factory at Orangeville, Ont., was carried. A new factory is to be erected at a cost of $50,000, and is to be completed and in operation within 18 months.

The Brinton Carpet Company, Peterborough, Ont., will make large additions to its factory.

Four acres of land adjoining the Canadian Pacific Railroad station at Hull, Ont., have been purchased from the Scott estate by H. O. Coplan, of the Coplan Foundry Company, Ottawa, Ont. It is understood that the company intends transferring its present plant to that city. The project is not a certainty yet, as Mr. Coplan wants several concessions, among them the exemption from taxation. The city authorities, it is understood, are favorable to his locating the plant there.

It has been announced by the Canadian Locomotive Works, Kingston, Ont., that the management is making a determined effort to try and increase the monthly output for July to 14 or 15 locomotives, which compares with an output in June of 10 locomotives. A great portion of the plant improvements remain to be carried out, and it is figured that they will not be completed much before another year. In the meantime the management is getting the best results possible out of the existing plant.

The International Chemical & Color Company, Ltd., Bridgeburg, Ont., recently incorporated with a capital stock of $100,000, by F. R. Humpage, Buffalo; A. W. Ramage, Toronto, and John T. James, Bridgeburg, will build a large factory for the manufacture of paints and colors at Bridgeburg adjoining the small experimental plant which has been operated for some time under the same name.

The Canadian Rogers Company, Toronto, manufacturer of silverware, will erect a factory, 72 by 150 ft., three stories and basement, on King street, West Toronto, to cost $50,000.

The city of Windsor, Ont., will build an incinerator plant to have a daily capacity of 25 tons. M. E. Brian, city engineer, will receive bids until July 29.

The Wilson Carbon Paper Company, Ltd., Montreal, has been incorporated with a capital stock of $200,000 by E. C. Budge and Alexander Falconer, of Westmount, Que., and others, to manufacture typewriter ribbons, carbon paper, and other office supplies.

The Stowell Screw Company, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by A. Decary, P. A. Decary, Elphege Marier and others to manufacture wood screws, machine screws, bolts, wire goods and wire shapes.

The Cimon Shoe Company, Ltd., Montreal, has been incorporated with a capital stock of $150,000 by A. P. Cimon, C. L. Papineau, E. Baril, and others to manufacture boots and shoes.

Western Canada

WINNIPEG, July 19, 1913.

The volume of business in machinery and parts during this week was fairly good. The different houses in Winnipeg have been receiving substantial orders, and they are also fairly busy on business booked previously. Trade generally, however, is not as active as at the corresponding period of the last year or two. The outlook continues to improve, although it is quite likely that the money stringency will continue for most of the remainder of the year, and some industrial expansion which has been under contemplation will be postponed until next year. There is a considerable amount of work that will need much machinery under consideration for the coming weeks.

The contract for the new Manitoba Parliament buildings to be erected in Winnipeg has been let to

Thomas Kelly & Sons, Winnipeg. The cost of the buildings will be about $3,000,000.

G. W. McPhee, Saskatoon, Saskatchewan, is the president of a company being formed in that city to develop coal areas in central Alberta, at the town of Castor. A charter has been applied for, with an initial capital stock of $100,000.

A by-law has been carried in Grenfell, Sask., to raise $35,000 for the purpose of installing a municipal electric plant. It is expected to have the plant in operation this fall.

The Lawrie Wagon & Carriage Company, Winnipeg, will increase the capacity of its plant, and for that purpose has applied for authority to increase its capital stock to $100,000.

The Port Arthur Wagon Company, Port Arthur, Ontario, has been reorganized under the name of the Port Arthur Wagons & Implements, Ltd., and manufacturing will be undertaken as soon as all the necessary machinery can be installed. D. C. Cameron, lieutenant-governor of Manitoba, is one of the leading men in the reorganization.

A report from Melville, Sask., says that the Dominion Milling Company will erect a flour mill there, with a capacity of 300 barrels per day.

The British American Elevator Company, Ltd., Winnipeg, is laying out a programme for the erection of a string of elevators in eastern and central Saskatchewan. Work is now under way on two elevators in the Pleasant Valley, near Melfort, Sask.

It is reported that the Brand Stove Company will erect a factory at Regina, Sask., at a cost of about $200,000.

The Canadian Stewart Company, Fort William, is the contractor for the plant of the Fort William Starch Works, to be erected at a cost of about $750,000.

S. D. Sparrow, Russell, Manitoba, is the general contractor for an $18,000 electric light plant to be installed in that town.

A company to be known as the Lethbridge Industrials, Ltd., Lethbridge, Sask., capitalized at $25,000, is being formed to attract industries to Lethbridge, Sask. The company is composed of business men and is patterned somewhat after the larger company of business men in Saskatoon, named the Saskatoon Industrial League.

Announcement is made at Edmonton, Alberta, that D. K. George, of London, England, head of an English syndicate, and W. H. Waine, of Cardiff, Wales, have taken over 8000 acres of coal lands in the Canmore district south of Edmonton, the price paid being over $2,000,000. The purchasers have organized the Canmore Navigation Coal Company, Ltd. The property is to be developed at once and it is expected that shipping operations will be under way early in October.

A Dominion charter has been granted to the Dwyer Elevator Company, Ltd., Fort William, Ont.

The Great Northern Harness Company will erect a factory at Edmonton, Alberta, for the manufacture of harness. The building will be of fireproof construction, 50 x 150 ft.

The Flax Products Company, Regina, Sask., proposes to erect in the near future a plant for manufacturing building paper, chip board and staw board.

Robert Weeder, Fort Saskatchewan, Alberta, contemplates building a flour mill, at a cost of $18,000, at Innesfree, Alberta.

The P. Burns Coal Mines, Ltd., Calgary, Alberta, has been incorporated, with a capital of $1,000,000. The company proposes to carry on mining operations and to deal in areas producing coal, iron, petroleum and gas.

C. H. Ackerman, of the Ackerman Leather Company, Peterborough, Ont., is in Edmonton, Alberta, and has purchased a factory site. It is understood that construction will begin at an early date.

The Consolidated Asphalt Corporation of Canada, Ltd., Winnipeg, Man., has been incorporated with a capital stock of $1,500,000 by C. W. Field, Joseph B. Shaw, both of Edmonton, and P. Ney, T. S. Ewart and others of Winnipeg.

W. Eilander, in a recent paper before the Association of German Ironmasters, stated that apart from its use in the ferroalloy industry, the electric furnace will soon not only have conquered the whole field of quality steels, but also have gained a strong hold as regards the production of medium qualities hitherto left to the open-hearth furnace. He showed that the cost of producing electrically refined basic Bessemer steel, when large units are used, is quite as low as that of the open-hearth standard qualities, and even lower.

Government Purchases

WASHINGTON, D. C., July 17, 1913.

Bids will be received by the general purchasing officer, Isthmian Canal Commission, Washington, until August 4 for pillar cranes.

The supervising architect of the Treasury Department, Washington, will receive bids until August 6 for an elevator plant for the Federal Building at New Orleans.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids for supplies for the navy yard as follows:

Until August 5—Schedule 5644, for an electric traveling crane for Boston; schedule 5645, for a hand-power traveling crane for Brooklyn; schedule 5646, a motor-driven flange facing machine for Philadelphia; schedule 5647, a 6-in. combination, shockless, jarring and roll-over molding machine for Norfolk.

Until August 19, all for Mare Island: Schedule 5663, iron melting cupolas, a ladle heater, and a pneumatic screen shaker; schedule 5664, a 50-kw. and a 100-kw. turbo-generator set; schedule 5666, a positive pressure motor-driven blower; schedule 5667, high speed reamers.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids July 15 for supplies for the navy yards as follows:

Schedule 5579—Steam Engineering.

Class 1, Mare Island—One engine lathe—Bid 34, $1197; 39, $1130; 49, informal; 55, $935.50; 69, $1432 and $1379; 78, $1412; 95, $1165; 96, $1274 and $1305; 101, $1088; 113, informal.

Class 1, Alternate—Bid 39, $1050; 55, $845.50; 69, $1335 and $1282; 78, $1297; 95, $1090; 96, $1208 and $1235.

Class 2, Mare Island—One shaper—Bid 34, $1004; 49, informal; 55, $741 and $817; 69, $1086, $1078, $985, and $734; 95, $630; 96, $971 and $1112; 113, informal.

Class 2, Alternate—Bid 55, $660 and $714; 69, $953, $960, $879, and $678; 95, $580; 96, $900 and $1045.

Class 3, Mare Island—One drill press—Bid 34, $559; 49, informal; 55, $401.25; 95, $245; 96, $514.

Class 3, Alternate—Bid 55, $366.25; 95, $215; 96, $468.

Class 4, Mare Island—One emery grinder—Bid 24, $181.50; 28, $172; 34, $623; 49, informal; 55, $180; 69, $241.25; 95, $320; 96, $527; 120, $444.50.

Class 4, Alternate—Bid 55, $158; 69, $223.75; 95, $300; 96, $500; 120, $409.20.

Following is a list of the bidders whose numbers are found with the bids given above:

24. James Clark, Jr., Electric Company. 28. Cincinnati Electrical Tool Company. 34. Eccles & Smith Company. 39. Fairbanks Company. 49. Harron, Rickard & McCone. 55. Kemp Machinery Company. 69. Manning, Maxwell & Moore. 78. Niles-Bement-Pond Company. 95. Pacific Tool & Supply Company. 96. Rix Compressed Air & Drill Company. 101. Rahn-Larmon Company. 113. Springfield Machine Tool Company. 120. Universal Trading Company.

The following bids were received by Bureau of Yards and Docks, Navy Department, Washington, July 12 for furnishing an air compressor with accessories at the Puget Sound navy yard:

Item 1, reciprocating air compressor and compressor foundation, complete; 2, turbine-driven rotary air compressor and foundation; 3, compressors and accessories, fulfilling in every respect the performance requirements of the specification, but with such modifications in design as bidders may suggest; 4, deduct from items 1, 2, or 3 for omitting foundation; 5, deduct from items 1, 2, or 3 for omitting the condenser and cooler tube corrosion process, as described in paragraph 26.

Charles C. Moore & Co., engineers, item 1, 14 ft., $50,617; 10 ft., $49,500; item 4, deduct $3912 for 14 ft. and $2795 for 10 ft.; item 5, $3500.

Laidlaw-Dunn-Gordon Company, item 1, $47,525; alternate, $50,175; item 4, deduct $3600; alternate, deduct, $3800; item 5, deduct $2475; alternate, deduct $2475.

Mining Congress and Exposition at Philadelphia

Manufacturers of mining machinery, rescue and first-aid apparatus and safety appliances are to be given an opportunity to display their wares before the mining men of the country at a great industrial exposition to be held under the auspices of the American Mining Congress, in Horticultural Hall, Philadelphia, Pa., the week of October 20. This exposition, the first of its kind in this country, will be held in conjunction with the annual convention of the Mining Congress, and the double attraction is expected to draw to Philadelphia thousands of interested men. It will be national in scope, the metal mining interests of the West to be as fully represented as the coal mining of the East. While the plans are still in embryo, a number of leading manufacturers who have been approached have shown sufficient enthusiasm to lead to the belief that all the space will be taken in a short time.

"The convention which will be held at the same time as the exposition," says James F. Callbreath, Munsey Building, Washington, D. C., secretary of the congress, "will be the most important body of mining men ever gathered together. The industry has been making great strides in the last few years, and a number of problems have arisen that are to be discussed straight from the shoulder."

Trade Publications

Swing Hammer Pulverizer.—Jeffrey Mfg. Company, Columbus, Ohio. Bulletin No. 47. Illustrates and describes a device for reducing a variety of substances to a fine powder for laboratory and commercial uses. A number of different types of pulverizers are made, all of which are illustrated. Views of different installations are given together with a partial list of users classified according to the various materials handled. An illustrated description of a pulverizer for laboratory use appeared in *The Iron Age*, June 5, 1913.

Expansion Bolts, Drilling Machines and Specialties.—Diamond Expansion Bolt Company, 90 West street, New York City. Catalogue No. 285. Covers a line of expansion bolts, which are suitable for a number of different uses. A feature of the catalogue is an illustrated index of the various products, giving an engraving of the specialty, its name and the page upon which a description and specifications of it can be found. Mention is also made of the Rapid Fire drilling machine for brick and concrete and the Diamond reversible toggle bolts, illustrated descriptions of which appeared in *The Iron Age*, November 21, 1912, and March 9, 1911, respectively.

Automatic Control of Machine Tools.—Electric Controller & Mfg. Company, Cleveland, Ohio. Booklet. Lists a number of different applications of automatic control to motor-driven machine tools and is a reprint of an article appearing in the American Machinist. Practically all types of machine tools in common use are shown together with devices developed by this company for the automatic acceleration and control of electric motors.

Railroad Equipment.—Walter A. Zelnicker Supply Company, St. Louis, Mo. Bulletin No. 139. Calls attention to an extensive line of railroad and contractors' equipment, which is regularly carried in stock by this company. Among the equipment listed are shovels, boilers, engines, locomotives, cars of various kinds, pumping machinery, etc.

Electric Starter for Internal Combustion Engines.—Economy Electric Company, Economy, Pa. Circular. Gives general description and specifications for an electric internal combustion engine starter, which is made in either the generator or motor types. The generator, which can be driven at either crankshaft or magneto speed, can be mounted in any position and is intended to charge the battery. The motor starter possesses sufficient power to turn any four or six cylinder internal combustion engine at the rate of 150 r.p.m.

Pipe Cutting, Threading and Bnding Machines.—Treadwell Engineering Company, 90 West street, New York City. Folder. Calls attention to the Stoever line of machines for cutting, threading and bending pipe. One-half of the folder is given over to engravings of the different machines which will handle pipe ranging from ¼ to 12 in. in diameter, while the opposite section gives descriptions of the various features, such as the headstock, die head and chasers, the drive, the oiling system and the variety of bends which can be made. An illustrated description of one of these pipe cutting and threading machines appeared in *The Iron Age*, June 16, 1910.

Blower.—Green Fuel Economizer Company, Matteawan, N. Y. Folder No. 150. Describes a conical flow fan which differs from either the centrifugal or axial flow fans in that the air enters and passes through the fan wheel and through the diffusor or stationary housing obliquely to the shaft, so that the lines of flow substantially form a cone. It is claimed for this construction that a larger handling capacity with a given diameter of wheel is secured which permits high speeds and is efficient in producing pressure so that the volumetric capacity and the ability to run at high speeds possessed by the ordinary disk fan are combined with the power to produce moderately high pressures such as are required in heating and ventilating work. As the fan can be run at high speed, it is possible to connect it directly to either electric motors or steam turbines, thus eliminating belts, gears or chains.

Power Pumps.—Gardner Governor Company, Quincy, Ill. Circular P-8. Refers to the Gardner duplex power pumps which are built in the packed piston, center packed plunger, plunger and ring types. A description of these pumps is given together with views of the different styles. Mention is made of the special features of the pumps and condensed specification tables are included.

Tackle Blocks and Sheaves.—W. H. McMillan's Sons, 153 South street, New York City. Catalogue No. 28. Concerned with a complete line of tackle blocks for all sorts of uses on land and water and iron and wood sheaves. Illustrations of the various types of blocks are given with brief tables of the different sizes in which they can be supplied.

Refillable Fuses.—A. F. Daum Company, Pittsburgh, Pa. Wall hanger Shows the various types of refillable fuses for electric light and power circuits which can be supplied. These include different styles of knife-blade contacts, circular contacts for insertion between spring clips and one of the plug type.

Water Gauge.—American Safety Lamp & Mine Supply Company, Scranton, Pa. Folder. Illustrates the Delco safety water gauge. The advantages claimed for this gauge are the combination of strength and durability with light construction, the use of standard sizes of glass and the ability to read the water level easily from various positions.

Volute Centrifugal Pumps.—Henry R. Worthington, 115 Broadway, New York City. Catalogue No. W-202. Illustrates and describes a number of different styles of the volute centrifugal pumps which are built in a single side suction type, the double suction solid case type and a double suction pump with a horizontally split casing. The general construction of each of these three types is taken up with blue prints to show the interior details and half-tones to show the exteriors. Other special pumps for use in dry docks, sewage disposal plants and irrigation and dredging projects are shown and directions for installing, operating and testing these pumps are given. A number of tables of useful information are also included.

Alternating-Current Apparatus.—Fairbanks, Morse & Co., Wabash avenue and Eldredge place, Chicago, Ill. Bulletin No. 35. Deals with the construction and application of generators, motors and auxiliary equipment, in which a large amount of practical information is given in a condensed question and answer form. Following a short description of how alternating current is produced, the general points of construction and operating characteristics of alternating-current equipment are taken up. A glossary covering all of the electrical terms used is included as are a number of illustrations of various types of generators, motors and other apparatus.

Iron Cement.—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Extracts from instruction book No. 11. Shows a number of repairs that have been made by the use of the company's iron, blow hole and rivet cements. The various features of these cements and their uses are briefly touched upon.

Files.—Nicholson File Company, Providence, R. I. Booklet entitled "File Filosophy." This booklet, which is now in its eighth edition, gives some hints regarding the proper methods of using files and the varous applications of the most common types. After a brief introduction, a list of the different terms used in connection with files is given and this is followed by hints and suggestions as to the methods of using the tools. Descriptions of the more common files and their uses are given, the text being supplemented by a number of engravings showing the various kinds of cuts of teeth. An index is included, so that any subject covered in the 48 pages is easily found.

Pneumatic Tools.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 127. Illustrations and descriptive matter explain the operation of a line of pneumatic tools which includes drilling, reaming, wood boring, flue rolling, tapping and grinding machines. In addition to the descriptive matter, tables of specifications are given for each machine, showing the speed, air consumption, capacity, dimensions, weight and regular and extra equipment. A general description of the motor part of the machine is given, together with a discussion of the advantages of ball and roller bearings for portable pneumatic drilling machines.

Crushing, Grinding and Screening Machinery.—Kent Mill Company, 70 Broadway, New York City. Bulletins No. 39, 40 and 41. The first and last deal with the Maxecon mill for grinding, a special type for grinding any hard or soft friable material, such as cement clinker, limestone, ores, etc., being described in No. 41. The other bulletin describes and illustrates a separator for screening the product of crushing machines. In all of the bulletins, halftone engravings are given of the apparatus and different parts, and condensed specification tables are also included.

Belt Treatment.—Cling-Surface Company, Buffalo, N. Y. Booklet. Size, 6 x 6¾ in.; pages, 24. Describes and illustrates installations of Cling-Surface treated belts in a number of foreign countries. In addition to the installations illustrated, there is a list of those which are not shown, and a number of testimonial letters are also included.

Reinforced Concrete Buildings.—Turner Construction Company, 11 Broadway, New York City. Folder, entitled "Modern Industrial Buildings." Shows several samples of reinforced concrete construction as applied to modern industrial plants, with brief descriptions of the different buildings.

The Henry Vogt Machine Company, Louisville, Ky., reports the sale of a large lot of boilers to the Southern Railway for use on various divisions, and of two 300-hp. water-tube boilers to the Standard Oil Company for installation in Chicago. It also has the contract for the erection of three 60 in. x 140 ft. steel stacks for the new plant of the Kosmos Portland Cement Company, near Louisville, and plate steel work for cement bins and other features of the Kosmos plant.

The Foundry and Machine Exhibition Company, which is making preparations for the exhibit to be held in connection with the October conventions of foundry associations, has opened permanent offices at room 206, Hotel Sherman, corner Clark and Randolph streets, Chicago. The office telephone is Franklin 4026.